

Dames & Moore



PHASE II PROPOSAL

Site Screening Contaminant Investigation
July, 1986

Dames & Moore



CONTAMINATION ASSESSMENT STUDY - PHASE II MONSANTO FACILITY SITE, 9229 E. MARGINAL WAY SOUTH, SEATTLE

1.0 INTRODUCTION

Dames & Moore has completed the Phase I scope of work for the contamination assessment study at Monsanto as outlined in our June 12, 1986 proposal. The product of Phase I, as defined in the proposal, is the Phase II sampling and analysis plan presented in this report. The object of the Phase II site investigation is as follows:

- To determine the potential presence of soil and ground-water contamination beneath the Monsanto Facility site located at 9229 E. Marginal Way South, Seattle, Washington;
- 2. Where such potential exists:
 - a. To differentiate where possible process-related contamination of the soils and/or ground water from that which originated from other offsite activities; and
 - b. To differentiate vanillin-related process contamination of the soils and/or ground water from historic onsite nonvanillin related activities.

During Phase I we have conducted activities necessary to properly develop a study plan. These activities are categorized as follows:

- Site visits and interviews by senior Dames & Moore personnel;
- Research into Dames & Moore and Monsanto files to compile available geological, hydrogeological, geochemical data, and product information relevant to onsite/offsite activities;
- ° Contacts with regulatory agencies in order to determine local and regional regulatory concerns and status;
- Development of a sampling plan for soils and groundwater;

- Determination of chemical analyses to be performed, including the necessary level of quality assurance/quality control;
- Preparation of a health & safety plan for field activities;
 and
- Development of a project schedule and costs.

We have been guided in our Phase I activities by the primary considerations of the extremely tight project schedule required, and the need to assess potential contamination resulting from various plant processes as differentiated from potential offsite contamination.

We believe our strategy is logical because of the goals of the program. We are charged with the task of providing information for an assessment of liability resulting from diverse site activities. We are not attempting to geologically characterize the entire site, nor are we providing information to be used to design methods for mitigation of any possible site contamination.

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2.0 REVIEW OF INFORMATION OBTAINED

A site visit to the Monsanto Facility was made on June 19, 1986. We reviewed information concerning current and known past on- and off-site operations and materials handling. Dames & Moore requested and obtained from Monsanto specific data related to surface water discharges, plant site leaks and/or spills, materials handling onsite with requests for specific Material Safety Data Sheets, relevant consultant reports and aerial photographs. Subsequent visits to the Monsanto plant site were made on June 20 and 23, 1986, in which interviews were held with "old time" employees. We interviewed Mr. Art Stevens and Mr. Gordy Brown who discussed the historic dry glue and resin operations and the vanillin operations, respectively.

To ascertain the extent of existing agency studies and data available in proximity to the Monsanto Facility, an initial informational survey was conducted. Federal, state and local agencies were contacted to determine both the location of completed studies and the status of ongoing investigations. To preserve client confidentiality, agencies were asked for information spanning the area from Slip 5 south to the Head of Navigation, which encompasses the Monsanto plant site area. The following is a list of the agencies contacted and a brief synopsis of the information obtained. We merely report the substance of the information transmitted, and have made no assessment of their accuracy.

2.1 WASHINGTON STATE DEPARTMENT OF ECOLOGY (WDOE)

WDOE has concern regarding VBLS on the open pad, since the pad is unbermed and drains into the storm water system. Monsanto's use of scale control biocides as additives in its cooling tower also concerns WDOE. WDOE stated that Monsanto has three outfalls, not all of which are permitted.

2.2 MUNCIPALITY OF METROPOLITAN SEATTLE (METRO)

From METRO we received Duwamish River surveys for September 1982 and July 1983, a map from the EPA study of Elliot Bay, current sediment and water quality samples from Duwamish Yacht Club outfall from June 3, 1986, and dust samples from sites by Michigan and Fourth South Streets. METRO uses these as background data for sediments.

METRO conducted a water quality assessment of the Duwamish waterway in 1983. The report outlining this study includes chemical analysis of sediments and discussion of hydrogeologic conditions. Also included are tables on annual pollutant inputs for documented sources, annual pollutant mass balances, and general discussion related to chemicals present within the waterway. METRO has also published the Duwamish Water Plan, a planning document which discusses options for pollution control.

2.3 ENVIRONMENTAL PROTECTION AGENCY (EPA)

Through the Elliott Bay Toxic Action Program and in cooperation with other resource management agencies, WDOE and EPA are developing a program designed to correct toxic problems in the Elliott Bay system. The objectives of this program include the identification of problem sites based on toxic contamination and related biological effects, the identification of toxicant sources, the prioritization of problem sites and sources, and the outline and evaluation of corrective actions.

A two-phased program has been developed to meet these objectives. In the first phase, interim actions are specified for high priority areas based on available data. Two documents have been prepared for EPA entitled "Interim Work Plan" and "Initial Data Summaries and Problem Identification". Based on an initial review of the Interim Work Plan, Slip 6 has been identified as a "No Immediate Action" area. The data summary report contains useful information related to the general layout of the area, existence

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and locations of sewer and storm drains and potential contaminant sources along the waterway. A Final Action Plan is scheduled to be \checkmark completed within the next six to nine months.

2.4 ARMY CORPS OF ENGINEERS

The Corps has recently completed a study at the Head of Navigation as a part of its operations and maintenance program. The Head of Navigation is located adjacent to Slip 6; several sampling locations are situated downstream from this point. Two composite samples corresponding to Slip 6 area contained relatively high levels of arsenic, copper and sulfides. Some chlorinated pesticides were detected in one sample.

In addition, the Corps files contained the Duwamish Waterways Navigation Study, June 1980, the Duwamish Waterways Navigation Improvement Study, February 1981, the Final Feasibility Report and Environmental Impact Statement, for the East, West, and Duwamish Waterways Navigation Improvement Study and the Study Plan for the Duwamish Reconnaissance Survey.

2.5 PORT OF SEATTLE

From the Port we received a copy of a 1972 study conducted in the Slip 6 area. Parameters tested included total solids, volatile solids, COD, nitrogen, oil and grease, mercury, lead, zinc, phosphorus, and oxygen demand and settleability. Boeing has recently completed a study of the Slip 6 area as a condition of their purchase of the property to the south of the slip from the Port. The Port attempted to obtain permission from Boeing to release this information, but this request was not granted. The Port mentioned that from time to time sand blasting has occurred in the Slip 6 area and may have resulted in high concentrations of heavy metals.

2.6 OTHER AGENCIES

Other agencies contacted where limited data were available include the Puget Sound Water Quality Authority, the National Oceanic and Atmospheric Administration and the King County Records Office.

Currently, the State of Washington is emphasizing stricter enforcement of existing air, water quality and hazardous waste laws. Issue papers prepared by the Puget Sound Water Quality Authority have raised awareness of pollution issues in Puget Sound and have also focused attention on the lack of past enforcement done by the Washington State Department of Ecology. The Elliott Bay task force was formed to inspect industries in Elliott Bay and the Duwamish River for illegal discharges. In addition, the U.S. Attorney's office is also doing surveillance of industries on the Duwamish.

Future emphasis will be placed on compliance with NPDES and Waste Discharge permits in the area. New NPDES permits will be much stricter and may include regular testing for EP toxics, bioassays, and some form of pretreatment. WDOE is also changing its policy as to cleanup of areas with hazardous waste. It will be utilizing existing laws to require parties to pay for studies, cleanup and remedial actions upfront, rather than using state funds and seeking cost recovery. The state will also require that cleanup be conducted in accordance with their final cleanup policy.

3.0 SAMPLING PLAN

The sampling plan developed for the project includes boring for installation of groundwater monitoring wells and collection of soil samples, and hand-augering to obtain soil samples. Each of these sampling methods is addressed in this plan.

3.1 GROUNDWATER MONITORING WELLS

3.1.1 Introduction

Ten to twelve ground water quality monitoring wells will be installed, developed and sampled at seven to nine drill sites at the Monsanto Facility. Three of the drill sites are planned to have dual completion monitoring well installations. The ground water monitoring wells will be installed primarily to detect the presence of potential contaminants floating and dissolved in the ground water beneath the Monsanto Facility.

3.1.2 Anticipated Geology and Hydrostratigraphy

Based on previous Dames & Moore borings on the Monsanto Facility, the anticipated soil stratigraphy beneath the facility is shown on the attached Figures 3-1 through 3-5. In general, a seven layer geological model is expected. From top to bottom the layers are as follows:

- 1. Silty sand (fill); approximately 10 feet thick,
- 2. Fine to medium grained sand; approximately 30 to 40 feet thick,
- 3. Silty sand; approximately 10 feet thick,
- Clayey silt with lenses of fine sand; approximately 20 feet thick,
- 5. Sand; approximately 20 feet thick,
- 6. Sandy silt; approximately 10 feet thick, and
- 7. Glacial till.

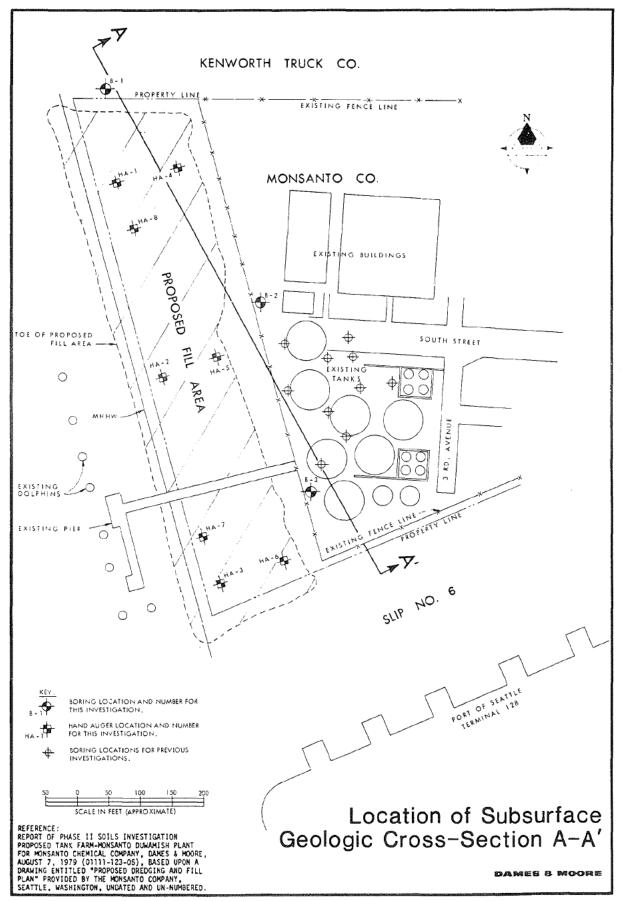
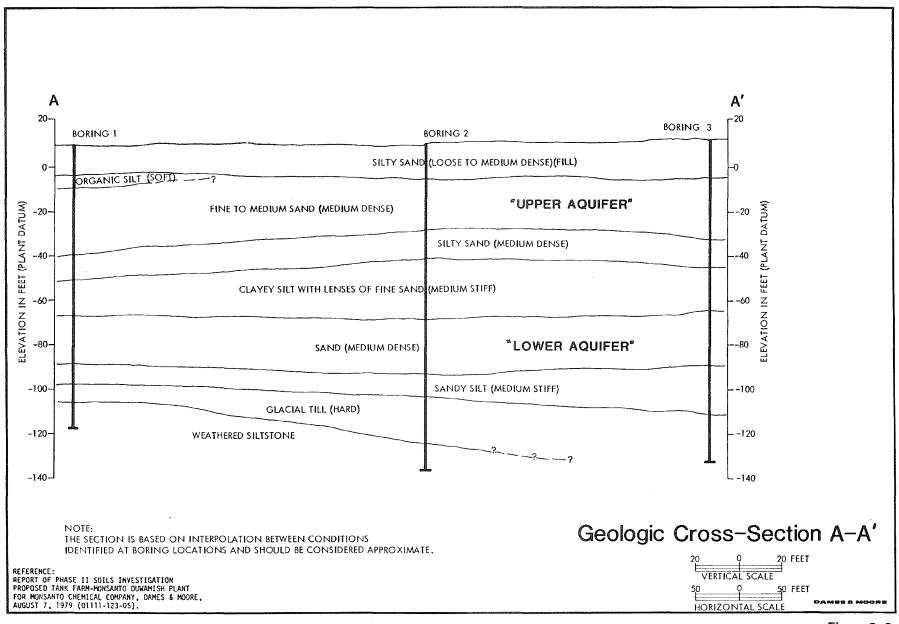


Figure 3-1



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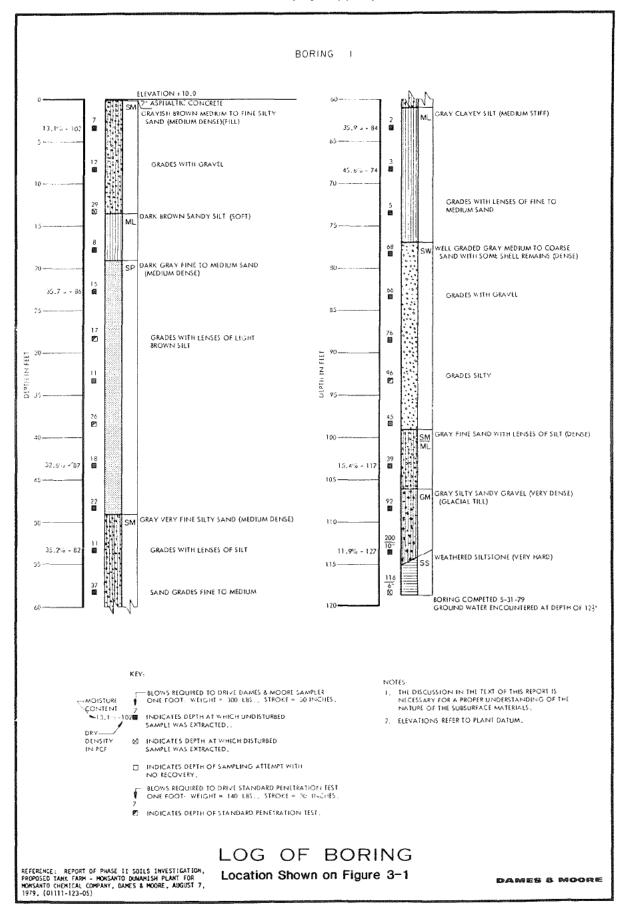


Figure 3-3

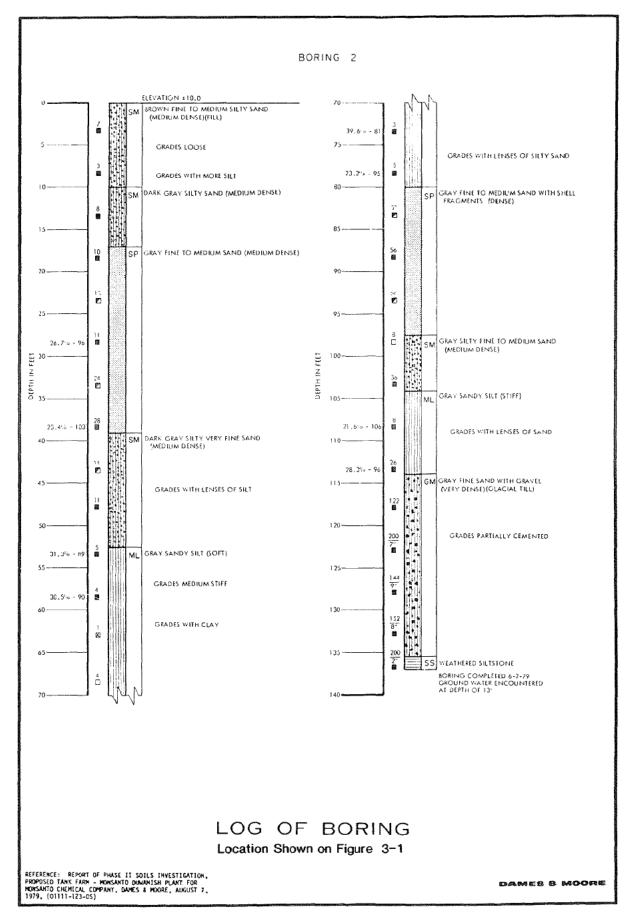


Figure 3-4

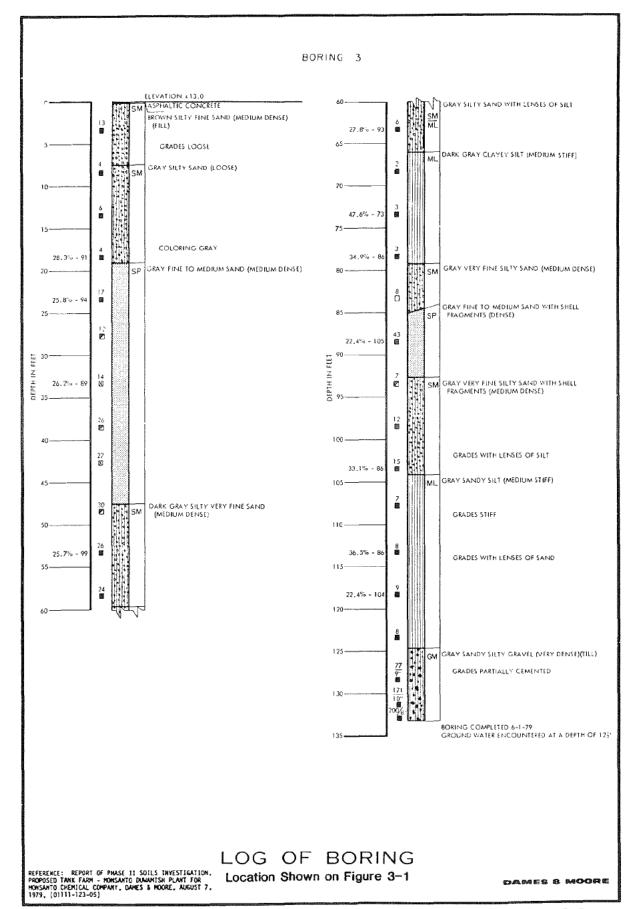


Figure 3-5

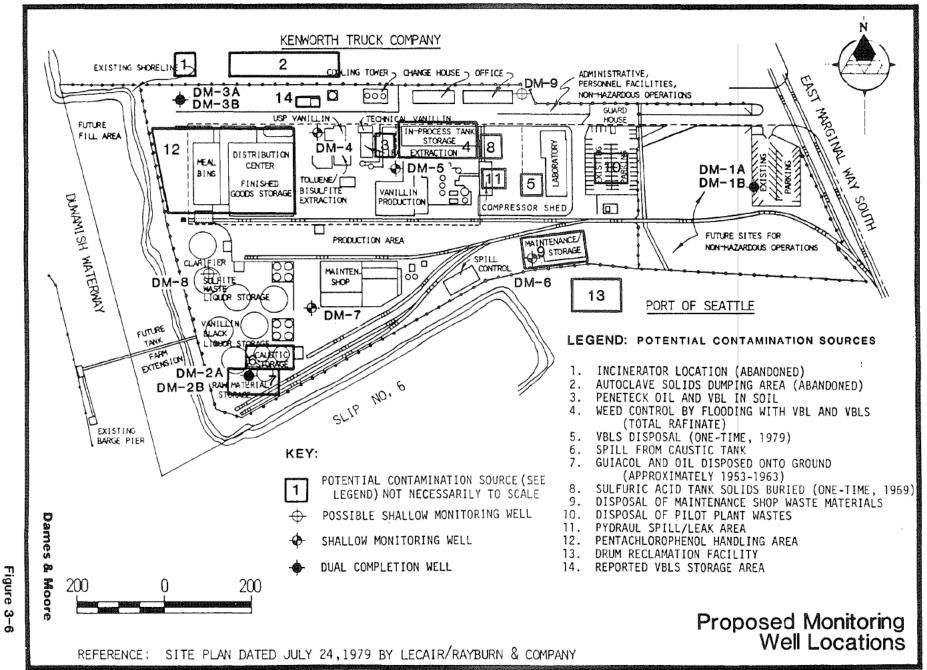
The general hydrostratigraphy is considered by Dames & Moore to be a five layer model. From top to bottom the layers are anticipated to be as follows:

- Unsaturated zone; silty sand (fill); approximately 10 feet thick,
- 2. Upper aquifer, considered to be unconfined; fine to medium sand; estimated hydraulic conductivity on the order of 10^{-2} to 10^{-3} cm/sec; approximately 30 to 40 feet thick,
- 3. Aquitard; silty sand to clayey silt; estimated hydraulic conductivity on the order of 10^{-4} to 10^{-6} cm/s; approximately 30 feet thick,
- 4. Lower aquifer, considered to be confined; sand; estimated hydraulic conductivity on the order of 10^{-1} to 10^{-2} cm/sec; approximately 20 feet thick, and
- 5. Lower aquitard/basement; sandy silt to glacial till; estimated hydraulic conductivity on the order of 10^{-7} to 10^{-8} cm/sec.

3.1.3 Borehole Location and Drilling Method

Seven to nine boreholes (Figure 3-6) will be drilled by the cable tool method by Hokkaido Drilling & Developing Corp. under contract to Dames & Moore. Due to the time constraints of the study, two drill rigs will be operated concurrently on site. All drilling will be accomplished under the full-time supervision of a Dames and Moore hydrogeologist. Three of the boreholes (Nos. DM-1, DM-2 and DM-3) will be drilled into the lower aquifer. The remaining boreholes will be drilled into the upper aquifer only. At those sites where concrete is found at land surface, the borehole will be initiated by coring the concrete to minimize disturbance. All drill cuttings and fluid will be drummed, properly labeled and temporarily stored on the Monsanto plant site at a location designated by Monsanto. All drill cuttings will be composited for analysis to determine appropriate disposal. Following the completion of drilling and

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well installation, all drums shall be removed from the site by a Dames & Moore subcontractor. It has been verbally agreed by Montanto that Dames & Moore shall use Monsanto's generator number, if necessary, when removing drums for treatment/disposal.

3.1.4 Soil Sampling

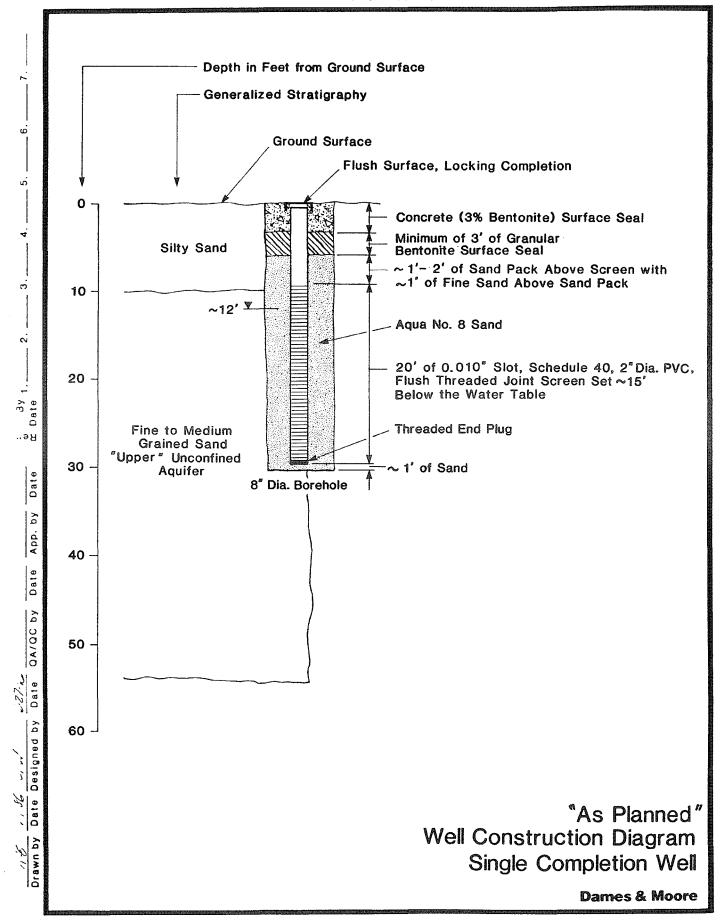
Standard split spoon samplers will be used to collect soil samples at intervals of 1, 5, 10 and every 10 feet thereafter below land surface and at lithology changes. The number of hammer drops required to drive the sampler will be recorded to indicate the relative rate of penetration. At two of the boreholes, the 1, 5 and 10 foot sample will be placed in glass jars, labeled and submitted to the laboratory for compositing and analysis (see Section 3.2, Soil Sampling). The remaining samples will be placed in glass jars, labeled and archived for later geologic evaluation at the Dames & Moore laboratory until the completion of the study. The onsite hydrogeologist will maintain a continuous log of the geology encountered during drilling.

3.1.5 Drilling & Well Completion

3.1.5.1 Shallow Monitoring Wells

Four to six single completion shallow monitoring wells (DM-4 through DM-9) will be drilled at the locations shown on Figure 3-6. The borings will be advanced with an 8-inch diameter drill and continually cased with steel to a depth of approximately 40 feet below ground surface. The shallow monitoring wells will be completed as shown on Figure 3-7. Twenty feet of 2-inch, flush threaded schedule 40 PVC screen with 10 slot mill cut openings will be installed in each borehole. The riser pipe will consist of 2-inch, flush threaded schedule 40 PVC. All threaded joints will be teflon taped during construction. A PVC threaded bottom cap and a top slip cap will be used. Stainless steel centralizers will be used as needed to maintain alignment of the monitoring well.

The screen will be installed with 2 to 3 feet of screen above the water table to enable sampling for 'floaters' while accounting for tidal

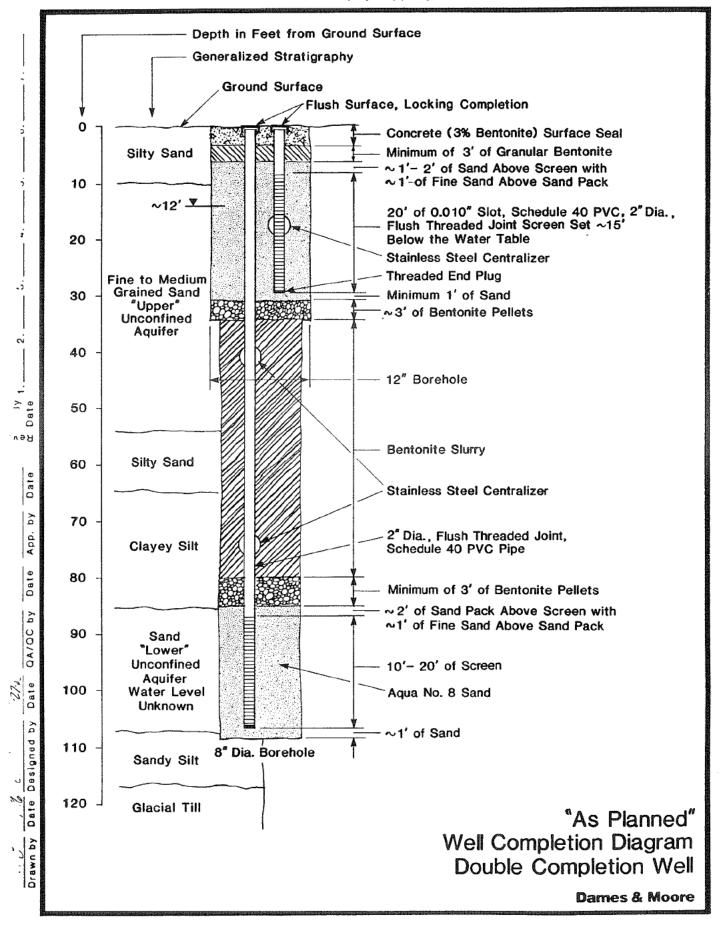


fluctuations. One foot of sand pack (Aqua #8) will be placed below the screen. One to two feet of sand pack will be placed above the screen. One foot of fine sand shall be placed on top of the sand pack to reduce bentonite infiltration. A minimum of 3 feet of granular sodium bentonite will be placed above the sand pack. Water will then be added to the borehole and at least 30 minutes allowed for the bentonite to swell. A mixture of cement and 3 percent bentonite will then be tremmied in the borehole, to bring the mixture to near land surface. The monitoring well will be completed at the surface with either an 8 inch monument casing (stick-up of about 1-3 feet) or will be placed in a below grade water-type box.

3.1.5.2 Dual Completion Monitoring Wells

Three deep boreholes for dual completion monitoring wells will be drilled at the locations shown on Figure 3-6. The borings will be advanced with a 12-inch diameter drill and continually cased with steel to the upper aquitard (approximately 50 feet below ground surface). To prevent the potential of cross contamination between the upper and lower aquifer each boring will be step cased. The shoe of the 12-inch diameter steel casing will be advanced a few feet into the upper aquitard and several feet of open hole will be drilled below the shoe. The open borehole will then be backfilled with bentonite balls, and the steel casing driven several feet ahead of the drilled borehole. Eightinch diameter drilling will continue to total depth as described in Section 3.1.5.1.

The dual completion monitoring wells (DM-lA [shallow], DM-lB [deep], DM-2A, DM-2B, DM-3A and DM-3B) will be completed as shown on Figure 3-8. Ten to twenty feet of 2-inch, flush threaded schedule 40 PVC screen with 10 slot mill cut openings will be installed in the lower portion of each borehole. The riser pipe will consist of 2-inch, flush threaded schedule 40 PVC. All threaded joints will be teflon taped during construction. A PVC threaded bottom cap and a top slip cap will be used. Stainless steel centralizers will be used as needed to maintain alignment of the monitoring well.



The screen will be installed from just below the base of the overlying confining layer through the lower aquifer. One foot of sand pack (Aqua #8) will be placed below the screen. Two feet of sand pack will be placed above the screen. One foot of fine sand will be placed on top of the sand pack to reduce bentonite infiltration. A minimum of three feet of sodium bentonite pellets or balls will be placed above the composite sand pack. A minimum of fifteen feet of bentonite slurry will be tremmied into the borehole above the bentonite pellets. A shallow monitoring well will be completed in the upper portion of the borehole as described in Section 3.1.5.1. Each dual completion well (3 are proposed) will be completed at land surface with either an 8 inch monument casing (stick-up of about 1-3 feet) or will be placed in a below grade water-type box.

3.1.6 Well Development

Immediately after completion of the monitoring well, development will commence. Development will consist of surging, bailing, and nitrogen lifting the well until the amount of sand and silt produced are minimized. Development will continue until the well is silt free and pH and conductivity have stabilized or for a time period not to exceed 4 hours. All development water will be drummed, labeled and stored in an area of the plant site approved by Monsanto. All drill and development water will be composited for analysis to determine appropriate disposal of liquids. Following the completion of drilling and well installation all drums shall be removed from the site by a Dames & Moore subcontractor.

3.2 SOIL SAMPLING

3.2.1 Soils to be Sampled

The soils that will be encountered, as determined from a review of previous Dames & Moore reports, are likely to consist primarily of silt, sand, and fill characterized in the discussion of geological conditions in Section 3.1.2 of this report. Soils throughout the facility have potentially been exposed to various contaminants during the historic use of the site and since Monsanto's operations.

Soil sampling will be carried out entirely by Dames & Moore personnel.

3.2.2 Sampling Strategy

The goal of soil sampling is to provide specimens for analysis in order to determine the extent and likely source of any contamination present. Soil samples will be collected primarily from shallow hand-augered holes. Where possible, however, we will save cost and time by obtaining soil samples from borings drilled for the installation of groundwater monitoring wells.

Soil samples will be obtained at depths below the surface of 1 foot and 5 feet, which will be laboratory-composited for analysis. Depths greater than 5 feet are not required for soil sampling because of the relatively shallow groundwater table, and the solubility and mobility of most of the analytes.

Sampling locations have been selected based on the facility's operational history and site usage. To determine locations, we have conducted interviews of site personnel and examined Monsanto file information. Much of the available information was summarized in a Dames & Moore report submitted to Monsanto in July 1981, which identified eight specific areas of potential contamination. Further review by Monsanto has identified five additional areas of potential contamination.

Dames & Moore has judged that these potential areas are not "point sources" closely defined or located; rather, they represent activities that can only be generally located. As such, our strategy for sampling soils is to divide the plant into fourteen areas of concern and to obtain multiple samples within each area which will be composited to one area sample for analysis. There are trade-offs with this strategy; we compromise our ability to pin-point contaminant locations and quantify site specific contaminants, but we save considerable time and cost in reducing the number of samples that must be tested in the laboratory and the number of analytical results that must be interpreted.

3.2.3 Sample Collection and Handling

3.2.3.1 Site Conditions

Many of the sample locations are covered by concrete or other hard surfaces. Concrete cores will be cut to allow sample collection and minimize local disturbance to plant operation. In the event a shallow auger hole cannot be advanced to the required depth due to subsurface conditions, alternate concrete cores will be cut adjacent to the primary location until the appropriate samples are collected. We do not anticipate encountering ground water with the shallow auger holes.

3.2.3.2 Sampling Locations

Sample collection areas are listed in Table 3-1, along with the basis for selection of each, the number of samples to be composited and the method of collection (shallow boring); the parameters selected for analysis are defined by area in Section 4.0, CHEMICAL ANALYSIS. These areas (see Table 3-1) are keyed to the location map presented in Figure 3-9.

Sampled soils will be transferred immediately following extraction to sample containers prepared and provided by the analytical laboratory. Sampling implements will be stainless steel. Following secure closure and taping of each sample container, it will be appropriately labeled as shown below:

CONFIDE	ENTIAL	CHEMICAL	COMPANY	15088-001
SAMPLE	NO		DEPTH	
DATE		TIME	SAMPLED	ву

Sample numbers will be of the form: Date - Sample Area - Sample Location - Depth Interval (for example 7/12/86 - B-2-1). The date is the sample collection date, the sample area code indicates the letter of the sample area (see Figure 3-9 and Table 3-1), and the sample location is a number assigned to a specific location within the sample area. the specific locations of samples will be approved jointly by Monsanto and Dames & Moore.

TABLE 3-1 SAMPLE COLLECTION AREAS

		SAMPLES TO BE
AREA	BASIS FOR SELECTION	COMPOSITED
A	Disposal of Maintenance Shop and other wastes; Former underground gasoline tank adjacent to former offsite drum recycling operation	Auger - 3
В	SWL line leak; spill control pit leaks and pump area leaks	Auger - 2
С	Former concrete pit for plant wastewater; resin reactor pit location	Auger - 2
D	Caustic spills; chemical storage; guiacol and oil disposal on ground	Auger - 2
E	Former caustic pit; VBL/VBLS separation; liquids sump location	Auger - 3
F	Pentachlorophenol handling area; dry glue handling area; "boneyard" storage area	Auger - 3
G	RCRA storage facility	Auger - 1
Н	Production area	Auger - 3 Drill - 1
I	Peneteck oil and VBL in soil; toluene line leak	Auger - 3
J	Spills and disposal of liquid copper catalyst; underground tank for copper catalyst storage	Auger - 3 Drill - 1
K	Pydraul Spills and leaks; leaks from drip pans around compressors	Auger 2
L	VBLS disposal site	Auger - 2
М	Disposal of pilot plant wastes	Auger - 2
N	Sample for determination of background concentrations of contaminants	Auger - 3

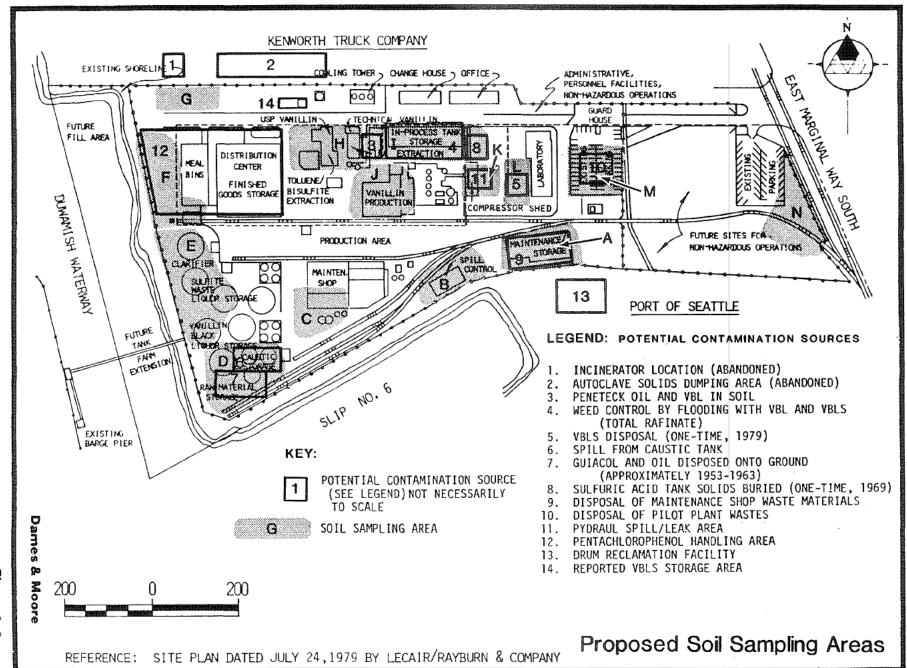


Figure 3-

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All sample jars will be prepared and provided by the analytical laboratory. All sample jars will be sealed with tape and will be temporarily stored in iced coolers prior to overnight shipping to the laboratory.

3.3 DECONTAMINATION PROCEDURES

A decontamination area will be established south of the maintenance shop as defined by Monsanto. All drilling, soil sampling and development equipment will be steam cleaned at the designated decontamination area on site. Water will be supplied by onsite Monsanto service. The waste water from steam cleaning will be handled by Monsanto.

One decontamination rinse water sample will be collected for analysis as a field blank. For this sample, a stream of deionized water will be poured over sampling implements and collected in a clean water container, then transferred to a sample container. This sample will be labeled similarly to soil samples, with the location indicated as the location most recently sampled.

3.4 EQUIPMENT

3.4.1 Personnel Protective Gear

Personnel protective gear, including field detection instruments, is described in the project Health & Safety Plan.

3.4.2 Sampling Equipment

- Staking Sampling Locations Stakes Hammer Tape Measure (100') 6' Engineer's Rule Flagging Marking Pens Location Map and Table
- Monitoring Well Boring Sampling
 Utility Clearance
 Client Sign-off on Field Agreement Forms
 Boring Log Forms
 Drill Rig
 Split Spoon Sampler

Drive Head Adapter Spanner Wrench Unit

Auger Sampling (General) Hand Auger Post-Hole Digger Stainless Steel Spoons Stainless Steel Sample Knives Sampling Table Sample Jars Pens Labels Chain-of-custody Forms Coolers Ice Tape Measure (100') 6' Engineer's Rule Notebook Location Diagram and Table Duct Tape Shovel

Decontamination
 Steam Cleaner
 DI Water
 Squeeze Bottle

3.5 DOCUMENTATION

Sampling activity will be documented by a field sampling log kept contemporaneously with sample collection, and transcribed to field memos as soon as possible thereafter. For each sample, the following minimum information will be recorded: location; date; time of sample; sampling personnel; description of material sampled; sampling method; field measurements taken; reason for any deviation from sampling plan; and additional observations.

Chain-of-custody forms will be filled out and signed by sampling personnel and lab personnel, and will accompany samples at all times.

4.0 CHEMICAL ANALYSES

4.1 LABORATORY

All samples collected will be analyzed by Acurex Laboratories of Mountainview, California. Acurex was chosen because of its competitive costs and its ability to meet the important project turn-around time requirement, its capability to analyze for a comprehensive range of chemical parameters, and its ability to meet the strict quality assurance/quality control (QA/QC) requirements for the project.

4.2 SOIL ANALYSIS

Acurex will perform all required soils compositing, both lateral and by depth. Laboratory compositing is significantly more controlled and accurate than field compositing, and the loss of volatile organics during compositing is minimized if the samples have been refrigerated prior to handling.

Every soil sample will be analyzed for the parameters of pH, benzene/toluene/xylene (BTX), copper (Cu), and phenolic compounds by gas chromatography (GC Phenols) as a screen; if phenols are present, then the extract will be run using the GCMS method. Our rationale for performing this base analysis on every soil sample is derived from the requirement that we determine contamination related and unrelated to vanillin production. The parameter of pH is an important indicator of acid/caustic spills. The BTX analysis will allow us to differentiate between toluene contamination alone, and toluene contamination associated with benzene and xylene, indicative of petroleum releases. Copper and toluene have been widely used at the plant site. Products containing phenolics have also been widespread in the plant, but different phenolic compounds have been associated with different processes; the GC Phenol analysis will allow us to differentiate between these various forms of phenol. If present, ten of the largest remaining undefined chromatographic peaks will be given.

All soil analytical parameters and the rationales for their selection are presented in Table 4-1. On three soil samples, we will perform

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TABLE 4-1

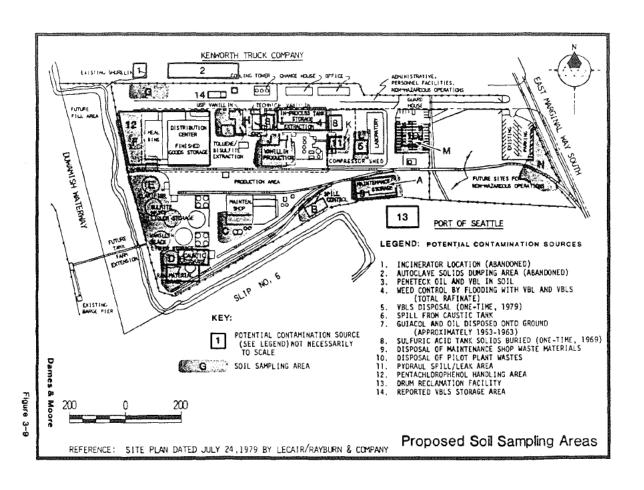
ANALYTICAL PARAMETERS RATIONALE

AREA	ANALYTICAL PARAMETERS	RATIONALE
A	HSL + Specific Compounds *	Unknown nature of solvents and greases dumped on ground; possible soil contamination from migration of offsite drum facility compounds
В	pH, Cu, BTX, GC Phenol	See text for discussion of general plant screening compounds
С	pH, Cu, BTX, ICP Metals, GC Phenol	See text for discussion of general plant screening compounds; other metals may be associated with resin production
D	pH, Cu, BTX, GC Phenol	See text for discussion of general plant screening compounds
E	pH, Cu, BTX, GC Phenol	See text for discussion of general plant screening compounds
F	HSL + Specific Compounds	Storage of wide range of plant equipment and materials at boneyard area
G	pH, Cu, VOA, Oil & Grease, GC Phenols	See text for discussion of general plant screening compounds; methylene chloride storage and other plant wastes
H	pH, Cu, BTX, GC Phenol,	See text for discussion of general plant screening compounds; mercury associated with tank gauges
I	pH, Cu, BTX, GC Phenol, Oil & Grease, Hg	See text for discussion of general plant screening compounds; mercury associated with tank gauges
J	pH, Cu, BTX, GC Phenol,	See text for discussion of general plant screening compounds; mercury associated with tank gauges
K	pH, Cu, BTX, GC Phenol, Oil & Grease, Hg, PCB's	See text for discussion of general plant screening compounds; mercury associated with tank gauges

TABLE 4-1 (Continued)

AREA	ANALYTICAL PARAMETERS	RATIONALE
L	pH, Cu, BTX, GC Phenol	See text for discussion of general plant screening compounds
M	pH, Cu, BTX, GC Phenol, Hg	See text for discussion of general plant screening compounds; mercury associated with vanillin production
N	HSL + Specific Compounds	Determination of background concentration of any contaminant found on the site

^{*} See Table 4-2 for HSL and Specific Compounds list



an analysis for a comprehensive range of parameters, which consists of the Hazardous Substances List (HSL) plus a number of compounds specific to the production of vanillin. A listing of all of these compounds is contained in Table 4-2.

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TABLE 4-2

ANALYTICAL PARAMETERS HAZARDOUS SUBSTANCE LIST*

VOLATILE COMPOUNDS

Acetone Benzene Bromoform Carbon disulfide Carbon tetrachloride Chlorobenzene Chlorodibromomethane Chloroethane 2-Chloroethylvinyl ether Chloroform Dichlorobromomethane (semi-quant.) Dichlorodifluoromethane 1,1-Dichloroethane 1,2-Dichloroethane 1,1-Dichloroethylene 1,2-Dichloropropane cis-1,3-Dichloropropylene Ethylbenzene 2-Hexanone Isopropyl alcohol* Methyl bromide Methyl chloride Methyl ethyl ketone Methyl isobutyl ketone Methylene chloride Styrene 1,1,2,2-Tetrachloroethane Tetrachloroethylene Toluene 1,2-Trans-dichloroethylene 1,1,1-Trichloroethane 1,1,2-Trichloroethane Trichloroethylene

Trichlorofluoromethane (semi-quant.)

ACID COMPOUNDS

trans-1,3-Dichloropropylene

Benzoic acid 2-Chlorophenol 2,4-Dichlorophenol 2,4-Dimethylphenol

Vinyl acetate

Vinyl chloride

Xylenes (total)

ACID COMPOUNDS (Contd.)

4,6-Dinitro-o-cresol
2,4-Dinitrophenol
2-Methylphenol
4-Methylphenol
2-Nitrophenol
4-Nitrophenol
p-Chloro-m-cresol
Pentachlorophenol
Phenol
2,4,5-Trichlorophenol
2,4,6-Trichlorophenol

BASE/NEUTRAL COMPOUNDS

Acenaphthene Acenaphthylene Aniline Anthracene Benzo(a)anthracene Benzo(a)pyrene Benzo(b)fluoroanthene Benzo (ghi)perylene Benzyl alcohol bis(2-Chloroethoxy) methane bis(2-Chloroethyl) ether bis(2-Chloroisopropyl) ether bis(2-Ethylhexyl) phthalate 4-Bromophenyl phenyl ether Butyl benzyl phthalate 4-Chloroaniline 2-Chloronaphthalene 4-Chlorophenyl phenyl ether Chrysene Dibenzo(a,h) anthracene Dibenzofuran 1,2-Dichlorobenzene 1,3-Dichlorobenzene 1,4-Dichlorobenzene Diethyl phthalate Dimethyl phthalate Di-n-octyl phthalate 1,2-Diphenylhydrazine Fluoranthene

TABLE 4-2 (Continued)

BASE/NEUTRAL COMPOUNDS (Contd.)	PESTICIDE/PCB COMPOUNDS (Contd.)
Fluorene	Endrin ketone
Hexachlorobenzene	Heptachlor
Hexachlorobutadiene	Heptachlor epoxide
Hexachlorocyclopentadiene	Methoxychlor
Hexachloroethane	PCB-1016
Indeno(1,2,3-c,d)pyrene	PCB-1242
Isophorone	PCB-1254
2-Methylnaphthalene	PCB-1221
Naphthalene	PCB-1232
2-Nitroaniline	PCB-1248
3-Nitroaniline	PCB-1260
4-Nitroaniline	Toxaphene
Nitrobenzene	
N-Nitrosodimethylamine	
N-Nitrosodi-n-propylamine	METALS
N-Nitrosodiphenylamine	
Phenanthrene	
Pyrene	Antimony
1,2,4-Trichlorobenzene	Arsenic
	Beryllium
	Cadmium
PESTICIDE/PCB_COMPOUNDS	Chromium (total)
	Copper
Aldrin	Lead
Alpha-BHC	Mercury
Beta-BHC	Nickel
Gamma-BHC	Selenium
Delta-BHC	Silver
Chlordane	Thallium
4,4'-DDT	Zinc
4,4'-DDE	
4,4'-DDD	
Dieldrin	GENERAL
Endosulfan I	
Endosulfan II	Asbestos
Endosulfan sulfate	Cyanide
Endrin	
Endrin aldehyde	

*2,3,7,8-Tetrachlorodibenzo-p-dioxin and phenols (total) have been deleted from the HSL for this project; isopropyl alcohol has been added.

SPECIFIC COMPOUNDS

Vanillin
Acetovanillone
p-Hydroxybenzaldehyde
Eugenol
Resorcinol
Brominated ethylene
Formaldehyde

Abietic Acid Guiacol Triphenylphosphate Isodecyldiphenyl phosphate Acetic anhydride Brominated acetylene Oil & Grease

4.3 WATER ANALYSIS

All water samples will be analyzed for the HSL and the specific compounds listed in Table 4-2, with the exception of asbestos. Water samples for metals analysis will be filtered in the field with a 0.4 micron filter; four water samples from monitoring wells DM-1A, DM-1B, DM-6, and DM-4 will also be analyzed for total metals (unfiltered). Our rationale for performing these analyses on all water samples derives from the fact that many compounds on the list may become mobile in the ground water and could be expected to be found in any ground-water sample. Mobility of hazardous substances in the ground water is a key issue in making any determination of liability.

4.4 QUALITY ASSURANCE/QUALITY CONTROL

Quality assurance (QA) is a system for ensuring that all information, data, and resulting decisions compiled under a specific task are technically sound, statistically valid, and properly documented. Quality control (QC) is the mechanism through which quality assurance achieves its goals. The laboratory QA/QC requirements for this project consist of the requirements of the EPA Contract Laboratory Program (CLP), which was developed to assure the quality of data resulting from Superfund investigations. It has since become the basic requirement imposed on analytical results to be used in Superfund litigation. For the purposes of this project, imposing the CLP requirements onto the laboratory is essential; the tight time constraint will prevent collection of additional samples or re-analyzing any samples if results are suspect.

The essential elements of the CLP QA/QC requirements are outlined in Table 4-3. These elements, along with the analytical result, will comprise the written report submitted by Acurex for each sample.

REPT2 4-7

TABLE 4-3 LABORATORY QA/QC REQUIREMENTS

REQUIREMENT	EXPLANATION
Duplicate analysis (Field Split)	A sample is analyzed twice for control purposes.
Matrix spikes and matrix spiked duplicates	A known amount of a compound determined to be present in the sample is added to the sample and that particular compound is re-analyzed to determine adequacy of analysis.
Method detection limits	Lower concentration limit above which lab is 99% certain that the actual result is not zero.
Trip blank	A sample of distilled, deionized water is sent to the field and returned unopened. It is then analyzed to determine whether any contamination results from the transportation process.
Field blank (Transport blank)	A sample of distilled, deionized water from the laboratory is used as a final rinsate of field equipment to determine if any contamination remains after field decontamination.
Holding blank	A distilled, deionized sample is held in the lab refrigerator with other samples to determine if lab procedures result in contamination, or if sample containers are clean.
Method blank	A sample of distilled, deionized water is analyzed to determine if any step of the analytical scheme results in any contamination, or can read a zero result.
Surrogate recovery	A labeled set of compounds chemically similar to compounds known to be present in the sample is added to each sample to determine if the matrix, or mix, of compounds present is the cause of any interferences.
Detector calibration curves	The daily calibration curves for analytical equipment are provided along with lab results.
Chromatograms	The printed chromatograms from analysis by GC or GC/MS are provided along with lab results.

TABLE 4-3 (Continued)

ID spectra	Spectral charts used for comparison against chromatograms are provided along with results.
Calibration data	All calibration data, including initial and continuing data, are reported for each lab instrument.
Chain-of-custody forms	Forms that are always in the control of the person who possesses the sample: includes all information about sampling methods and field conditions as well as sample identification and dated signatures of all sample handlers.
Reporting	Laboratory will report any problems encountered during analysis of samples.
Timeliness	Samples must be analyzed within specified holding period.

5.0 MONSANTO SAFETY/HYGIENE GUIDELINES

and

DAMES & MOORE HEALTH & SAFETY PLAN

This package of Monsanto Safety Guidelines and Dames & Moore Health & Safety Plan comprise the rules and regulations that are to be followed while conducting any activities on-site. Because of the nature of this job, if there are any conflicts or questions, the Guidelines are to take precedence over the Dames & Moore Plan, except where the Dames & Moore Plan is more restrictive.

SAFETY / HYGIENE GUIDELINES Seattle Plant

Number:

Title:

EMERGENCY PROCEDURE

Issued:

10-26-82

Revised:

10-24-85

Page 1

of 29

I. PURPOSE

To establish a procedure to minimize injury to personnel and damage to property resulting from fire, explosion, building collapse, release of hazardous materials or other emergency.

II. SCOPE

This procedure covers emergency situations that may arise in the plant and presents an outline of the course of action to follow in handling the situation.

In the absence of other specific instructions, all employes will be expected to follow the principles outlined herein and to exercise sound judgment in meeting the situation. The following are examples of emergency situations for which this procedure would apply:

- 1. Fire
- 2. Explosion
- 3. Major Power Failure
- 4. Bomb Threats
- 5. Accidents Involving Personnel Injuries
- 6. Serious Equipment Failure
- 7. Serious Fume, Emmissions or Flammable Liquid Leaks or Spills

Number: Title EMERGENCY PROCEDURE age 3 of 29

Responsibilities of certain members of the plant staff are outlined below:

A. Emergency Coodinator

The Plant Manager or TSD Superintendent will act as the Emergency Coordinator. The Coordinator has responsibility for:

- Directing the efforts of all site personnel during and following an emergency,
- 2. ALL RELEASES OF INFORMATION TO THE PRESS MAY ONLY BE MADE BY THE PLANT MANAGER.

B. Fire Chief

The Maintenance and Utilities Superintendent will act as the Fire Chief.

The Fire Chief has responsibility for:

- Coordinating the fire fighting efforts of Monsanto personnel with those of the local fire department,
- 2. Informing the fire department personnel of exposure hazards,
- Determining the best way to protect fire fighters from personal injury due to plant hazards.
- 4. Communicating with the Emergency Coordinator from the scene of the emergency.

C. Operations Chief

The Operations Superintendent will act as the Operations Chief. The Operations Chief is responsible for:

- 1. Monitoring the safety of plant production equipment,
- 2. Supervising the controlled shutdown of plant equipment, if necessary.

Number: Title EMERGENCY PROCEDURE Page 5 of 29

- C. Technical Services Superintendent must also:
 - 1. Keep current the following utility drawings or maps:
 - a. Electrical Distribution Drawings
 - b. Plant Water System
 - c. Natural Gas Emergency Shut Off Valves
 - Function as Emergency Coordinator in the absence of the Plant manager.
- D. Maintenance and Utilities Superintendent must also:
 - 1. Maintain an emergency communication system and provide plant radios to use in an emergency.
 - 2. Brief contractor personnel on evacuation procedures in an emergency.
 - 3. Insure that maintenance personnel in the plant know the above plan and are assigned responsibility for execution.
 - 4. Train the Maintenance Foreman and Chief in their emergency duties.
 - 5. Insure that all fire fighting equipment is operational and kept in good condition.
 - 6. Maintain agreements with neighboring fire departments and conduct periodic site inspections with the departments to familiarize them with the plant.
- E. Operations Superintendent must also:
 - Conduct periodic reviews to ascertain that the emergency plan contains emergency shutdown procedures for production areas under his/ her supervision.
 - 2. Identify in shutdown plan, emergency shut-off valves, switches, or other control devices.
- F. Personnel Superintendent
 - 1. Assume overall responsibility for the Plant Emergency Plan, including issuance, consulting, revision, and plan testing.
 - 2. Maintain a primary and secondary emergency control center, complete with:
 - a. Copy of plan
 - b. Maps
 - c. Municipal Telephone Books
 - 3. Routinely test radios.
 - 4. Assure adequate first aid supplies in the laboratory.
 - 5. Maintain up-to-date emergency telephone lists and emergency call

Number: Title EMERGENCY PROCEDURE Page 7 of 29

- 3. Whenever you are using the paging system, announce your message slowly and clearly. Include the nature of the incident, exact location, any known injuries and any special equipment needed.
- 4. The system can be deactivated by dialing one of the above codes or by hanging up. If you hang up, the system will shut itself down in 3 minutes.

B. Emergency Radio Communications

The plant has three handheld walkie-talkies and a base station for emergency communications found in the locations below. The units work on a radio frequency of 35.02 MHz. The other plant radios will not send or receive on the emergency frequency.

Base Station -- Maintenance Foreman's Office

Mobile Unit - Plant Manager's Office

Mobile Unit - Chief's Office

Mobile Unit - Maintenance Superintendent's Office

VI. PROCEDURES

A. Action to be Taken by Person Discovering the Emergency

The person discovering the emergency situation should do the following in order:

- Immediately activate the plant emergency alarm.
- Activate the ADT fire alarm if appropriate, which will bring the Fire
 Department and Aid Car to the plant.
- 3. Notify other personnel in the area of the emergency.

Number: Title EMERGENCY PROCEDURE Page 9 of 29

5. Personnel Superintendent

- a. Contact Control Center to receive instructions.
- b. Maintain communication with WHQ personnel.
- c. Determine need and arrange for:
 - 1) Supplies needed to assist in the emergency.
 - 2) Transportation of victims and workers.
 - 3) Medical facilities for care of injured.
- d. Coordinate headcount reporting for the site.

6. Accounting Superintendent

- a. Report to Emergency Control Center to receive instructions.
- b. Advise neighboring industries of the situation. See appendix IV for the list of companies and phone numbers.
- c. Direct the plant buyer to man the front gate to direct emergency vehicles and prevent unauthorized entry.
- d. Arrange to have all non-Monsanto personnel escorted off the plant site, if appropriate. Cross reference visitor names with the visitor log to account for all non-Monsanto personnel.
- e. Notify King County Sheriff of the emergency and request that access routes be kept clear.

7. Foremen

- a. Assist in emergency efforts if the emergency is in own department or
- b. If not directly involved, report to the chief operator's office and monitor the emergency radio.
- c. Begin performing headcounting function.

8. Employes in immediate area of emergency

a. Render assistance in controlling the situation unless otherwise directed.

9. Employes not in immediate area

- a. Mechanics and shippers report to their respective foremen's office for headcount purposes and wait for instructions.
- b. Operators report to the chief operator's office for headcount purposes. Then, proceed back to your work area to monitor equipment until told otherwise.
- c. If travel to any of the above mentioned offices is not feasible, report into the Emergency Control Center for headcount purposes, then either proceed to your work area or to the scene of the emergency as directed.

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- B. The assembly area for the plant is the Southwest corner of the parking lot. One person should write down the names of all assembled and give to the Personnel Superintendent for an accounting of plant personnel.
- c. Appendix VII details evacuation routes to be taken from all operating areas.

VIII. EMERGENCY MEDICAL AID

A. Facilities

- The laboratory will be the primary on-site location for treating injured personnel. Adequate emergency medical supplies are stocked in the laboratory at the sample drop off door.
- 2. The Chief's Office is stocked with additional first aid supplies to be used at the emergency site.

B. Medical Responsibilities

Any qualified first aid helpers should first report to their respective foreman or chief's office for headcount purposes. The fire chief will radio instructions about where to report.

IX. AIDING AN INJURED EMPLOYE

The following procedure should be followed whenever an employe is found injured.

A. The person discovering the injured should immediately ascertain whether the employe is breathing. If not, begin adminstering CPR and continue until help arrives. If the employe is conscious administer appropriate

Number: Title EMERGENCY PROCEDURE Page 13 of 29

- C. Survey the plant for extent of damage and report findings to plant supervision. When inspecting the plant, pay particular attention to the following:
 - 1. Ruptures or leaks in natural gas supply line, or around boilers. Use the portable flammable gas detector in the chief's office to detect leaks. If serious leaks are found near any operating equipment, the boilers should be shutdown and the gas company notified immediately.
 - Cracks, leaks, or damaged foundations on any tanks containing flammables, caustic, acid or sodium hydrosulphide. Survey all tank farms for leaking tanks.
 - 3. Building foundations for severe defects or structural damage.
- D. Shutdown plant, or areas of plant, if there is any question of personnel safety. Evacuate areas where safety concerns exist.

XI. ACTION TO BE TAKEN UPON RECEIPT OF A BOMB THREAT

- A. Person receiving the call should:
 - 1. Keep the caller talking as long as possible.
 - 2. Write down all of the information and try to find out the following:
 - a. Time of call
 - b. When the bomb is supposed to go off
 - c. Where it is planted
 - d. What it looks like
 - e. How it was planted

Try to record as much as possible of the conversation including the caller's name, if possible.

- 3. Listen and note any strange or peculiar background noise which may give a clue as to the place from which the call is being made.
- 4. Listen closely to the voice (male/female), voice quality, accents, speech patterns.
- Appendix VII is a telephone checklist that can be used to guide the receiver of the call through important information to be recorded.

Number: Title EMERGENCY PROCEDURE Page 15 of 29

- 2. Define the location of the individual directing the search.
- Inform the search parties of the exact information received as to the location and predicted time of explosion.
- 4. Provide floor plans of the area or areas to be searched.
- Make provisions for medical assistance and specify where anyone injured should be taken.
- 6. Give the location of any explosive experts, i.e., police department personnel.
- 7. Give the searchers any information about previous bomb incidents in the general area.
- 8. Give the deadline or time established to stop the search or interrupt it. Every effort should be made to complete the search as quickly as possible. It is generally desirable to complete the search within fifteen to twenty minutes.
- 9. Give specific instructions regarding areas or places to look.
- 10. Have plant engineering representatives available to cut off utilities in the area in case a device is located.
- Instruct searchers to report immediately any suspicious objects, and not to touch or move them. Only explosive experts should attempt to move or dispose of a suspected bomb.

Locations and areas where a bomb might be located are as follows:

- 1. Lockers.
- 2. Behind pictures or clocks.
- 3. Under loose boards.
- 4. Freshly painted or plastered places.
- 5. In toilet tank reservoirs.
- 6. Behind and under sinks and plumbing.
- 7. Inside couches and hollow furniture.
- 8. Basements.

Number:	Title			Dago		
Number.	11116	EMERGENCY	PROCEDURE	Page	17	oi 29

- D. As soon as possible, the Chief will notify either the Plant Manager or Operations Superintendent of the incident.
- E. The victim's Department Superintendent and Plant Manager will be responsible for the notification of the next of kin and family of the person involved. Usually this notification will take place as soon as practical after the incident has occurred.
- F. The Chief will caution the emergency vehicle driver and other employes not to call or otherwise notify the victim's relatives. The Chief will double check to be sure the hospital is aware the individual is enroute and communicate all pertinent information to the hospital.
- G. The Personnel Superintendent should be notified as soon as feasible. He/she will be responsible for preparing a written report of the incident.

***********	***********	******	**********
REVISED BY:	Safety Supervisor/Date	Plant Manager/Date	_
	EXECUTIVE SAFETY COMMITTEE		
			
•			

emergpro

Number: Title Page of Page 19 29

buildings.

3. Feeder #6

Controls 110 volt lighting circuit in IPA extraction building and Vanillin warehouse building for the north motor control center (GE panel) in autoclave areas.

- C. Shutdown and render inert the following equipment with nitrogen, if possible:
 - 1. 484 Toluene Stripping Still
 - 2. 458 Toluene Flasher
 - 3. 501 Oil Still
 - 4. 521 Oil Still
- D. Shut off feed lines to all the towers.
- E. Shutdown the centrifuge and open nitrogen bypass in 600 Area if time permits; also shutdown centrifuge in 700 Area.

emerprod

Number: Title EMERGENCY PROCEDURE Page 2

APPENDIX III

of 29

Fire Protection Equipment

- 12 Fire hydrants
 - Deluge sytem (on MVR unit)
- 4 Dry pipe sprinkler systems

300 extraction towers

400 extraction towers

Distribution Center

Maintenance Shop

5 Wet pipe sprinkler systems

200 Area

500/600 Area

Distribution Center (2)

Maintenace Shop

- 2 Foam and eductor nozzles (in Joy compressor building)
- 123 Fire extinguishers (including wheeled ext.)

emerlist

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Ala PAC - 762-6782 Dimensional Engineering and Fab Shop - 762-2466 EMS Group - 763-3040

Boeing Company - 655-1131/655-2121

North

Kenworth Truck - 767-8448

Boeing Company - 655-1131/655-2121 Jorgenson Steel - 762-1100/762-1104

East

Firestone Retread - 762-1880 Seattle Mechanics School - 762-5404 La Villa Taxco Restaurant - 767-0732

King County Airport Office Center

FAA/Boeing

West

Duwamish Yacht Club - 762-4530 Duwamish Marine Boat Yard - 767-4527

Delta Marine - 763-2383/762-9505 Boeing Company - 655-1131/655-2121

Foss Launch and Tug Dispatcher - 281-3810

(Barge operator)

Number:

Title EMERGENCY PROCEDURE

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APPENDIX VI

MONSANTO GENERAL OFFICE EMERGENCY CALL LIST

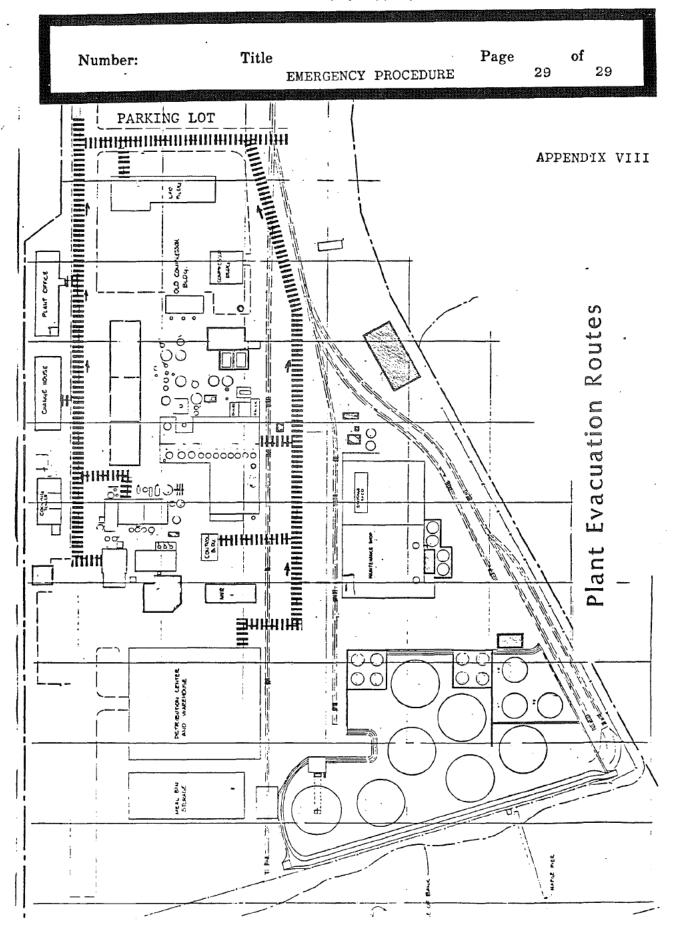
ENVIRONMENTAL OPERATIONS MANAGEMENT

NAME	POSITION	OFFICE*	<u>HOVE</u> **
William B. Papageorge	Dir., Environ. Oper.	29 80	(b) (6)
Alternate			
 Michael R. Foresman Harry M. Keating Charles P. Farley 	Mgr., Environ. Oper. Mgr., Environ. Oper. Mgr., Prod. Accept.	3289 3739 2918	(b) (6)
MANUFACTURING MANAGEMENT			
John E. Smith	Dir., Mfg.	2215	(b) (6)
Alternate			
Lloyd Boesch	Gen. Mgr. Mfg. MIC	3040	(b) (6)
PUBLIC RELATIONS			
Sarah G. Collins	Mgr., Public Reations	3 860	(b) (6)
Alternate			
Gerard D. Ingenthron	Dir. News Bureau Corporate	2883	(b) (6)
SAFETY AND PROPERTY PROTECTIO	<u>N</u>		
Ray E. Witter Thomas W. Lawrence		6007 6081	(b) (6)
INSURANCE			
Robert E. Toth David A. Stryker	Dir. Risk Mgmt. Mgr. Ins.	8581 7 553	(b) (6)

^{*} All office numbers are preceded by 314-694-Area code for all home numbers is 314

appenVI

Number:	Title EMEI	RGENCY PROCEI	Page	e o	f 29
				•	
MANNER		•			
CalmAngr	y Rational	Irrational	l <u>C</u> ohere	ent	
Incoherent					
Deliberate	Emotional	_Righteous	_Laughing		
BACKGROUND NOISES					
Factory Machin	eryTrains	Animals	Music	Office	Machines
MixedStr	eet Traffic	_Quiet Voices	Airplane	es	
Party Atmosphe	ere	Other	r		



SAFETY / HYGIENE GUIDELINES Seattle Plant

Number: VIII E Title: HAZARDOUS OPERATION (FIRE) PERMIT

-Issued: 12/20/82

Revised: Page 1 of

I. PURPOSE

Establish responsibility and provide an orderly method for the initiation, approval, and use of fire permits, in order to prevent fires caused by flame, heat and spark-producing equipment in the plant.

II. POLICY

A fire permit shall be required to operate equipment which might generate heat, sparks or flame anywhere in the plant. Permits are not needed in the Maintenance Shop building.

III. SCOPE

- A. This procedure is applicable to all Monsanto personnel and outside contractors.
- B. Operating the trackmobile, forklifts and backhoe will not require a fire permit. Authorization to operate any other internal combustion engine will require a permit. Refueling of any piece of equipment is subject to the following precautions:
 - 1. The engine shall not be refueled while it is running.
 - 2. Fuel must be transported in an approved safety can.
 - 3. A fire extinguisher must be present at the refueling site.

 The fire extinguisher selected should be OTHER than the extinguisher regularly assigned to the area. (Do not remove

Number: VIII E Title HAZARDOUS OPERATION Page 3 of 6

- o Fire equipment required
- o Person who will be the fire watch
- o Other special precautions

B. Approval of Permits

Supervisory personnel will approve fire permits under their jurisdiction (see Appendix A). Approval is defined to mean certification that all necessary conditions have been met for for work to proceed. This person accepts full responsibility for safe conditions in the area. In the event that owning department supervision is not available, approval may be obtained from any Department Supt.

C. Flammable Vapor Testing

- Flammable vapor testing will be performed by the permit initiator.
- Results of the flammable vapor test will be noted on the permit. (Any deflection of the meter may indicate an unsafe condition. Additional investigation is required.)
- 3. Flammable vapor testing is to be repeated daily, unless more frequent testing is deemed necessary by the person approving the permit.

D. Welding or Cutting in Confined Area

- When welding or cutting in a confined area caution must be taken to protect individuals from toxic vapors and oxygen depletion.
 - a. A vessel entry permit will be required as applicable.

Number: VIII E Title HAZARDOUS OF	
G. Completion of Work (Con't)	
will notify operating supervision	on or the chief and will initial
the permit in the space "Job Com	plete".
2. The person who performed the world	k will then return the permit
to his/her department foreman.	
H. Exceptions	
Any exceptions from this procedure	will be reviewed by the
Operating Superintendent and Plant I	Manager.
REVISED BY: Duch & 12/20/82	Plant Manager
Safety Superintendent	Plant Manager
	ث
EXECUTIVE SAFETY COMMITTEE:	
•	

SEATTLE PLANT

FIRE PERMIT

TOUCLU TO,	DATE:	EXPIRESDate/Time (Max 24 hrs)
WORK TO BE DONE:		
STANDARD PRECAUTIONS CHECK LIST: (If applicable, check when completed)	n	TOOLS TO BE USED: Gas Torch Welding Electric Tool Gasoline pump Other Other Other
SPECIAL PRECAUTIONS:		
Welding Clothing Breathing Air	****	
FLAMMABLE VAPOR TEST	Date/Time	Reading
·NITIATORPER	RSON PERFORMING	WORKInitials
APPROVED		EXCEPTIONS:
APPROVED Name Dat	e	EXCEPTIONS:
Name Dat Job Complete:	e forming Work)	EXCEPTIONS:

DAMES & MOORE HEALTH & SAFETY PLAN

PROJECT NAME:

Confidential

PROJECT NUMBER:

15088-001-05

DESCRIPTION:

Well Installtion, Soil & Water Sampling

PROJECT SITE LOCATIONS: Seattle, Washington

PROJECT MANAGER:

Dennis Goldman

SITE SAFETY OFFICER:

Ken Trotman/C.P. Wang

PLAN PREPARER:

Joe Darcy

PREPARATION DATE:

6-27-86

APPROVED:

Western Region Health and Safety Officer

Joe Darcy

(date)

REVIEWED:

Office Safety Coordinator

Gretchen Greenawalt (date)

J. Michael Blackwell

Western Region Geoscience Group Leader

(date)

Project Manager

Dennis Goldman

(date)

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13.0 APPENDIX 28

Tables
Map to Hospital
DOT List of Class A Poisons
DOT Hazardous Materials Classification
Plan Feedback Form
Exposure History Form
Accident Report
Daily Instrument Calibration Check Sheet
Plan Acceptance Form

1.0 PURPOSE

The purpose of this plan is to assign responsibilities, establish personnel protection standards and mandatory safety procedures, and provide for contingencies that may arise while operations are being conducted at the site.

2.0 APPLICABILITY

The provisions of the plan are mandatory for all onsite Dames & Moore employees engaged in hazardous material management activities including but not limited to initial site reconnaissance, preliminary field investigations, mobilization, project operations, and demobilization.

Contractors shall provide a Health & Safety plan for its employees covering any exposure to hazardous materials and shall complete all work in accordance with that plan. The contractor may choose to use Dames & Moore Health & Safety Plan as a guide in developing its own plan or may choose to adopt Dames & Moore's plan. In either case, the contractor shall hold Dames & Moore harmless from, and indemnify it against, all liability in the case of any injury. Dames & Moore reserves the right to review and approve the contractor's plan at any time.

Grossly inadequate H&S precautions on the part of the contractor or the belief that the contractor's personnel are or may be exposed to an immediate health hazard, can be cause for D&M to suspend the contractor's site work and ask the contractor's personnel to evacuate the hazard area.

The contractor shall provide its own safety equipment in accordance with health & safety plan requirements. The contractor will comply with all regulations including OSHA 29 CFR 1910.134 (Respiratory Protection).

3.0 RESPONSIBILITIES

3.1 OFFICE SAFETY COORDINATOR

The Office Safety Coordinator (OSC) generally will not be involved directly in onsite activities. However, the OSC will provide the following functions in support of the field activities:

- Maintain an adequate inventory of equipment in good working order;
- 2. Maintain all necessary files and records and see that copies of appropriate materials are forwarded to the Firmwide Health and Safety Officer (FWHSO) and the Western Region Health and Safety Officer (WRHSO).

Be available for consultation by the Project Manager or Site Safety Officer.

3.2 PROJECT MANAGER

The Project Manager (PM) shall direct onsite investigations and operational efforts. At the site the PM, assisted by the Site Safety Officer (SSO), has primary responsibility for:

- Assuring that appropriate personnel protective equipment is available and properly utilized by all onsite personnel;
- Assuring that personnel are aware of the provisions of this plan, are instructed in the work practices necessary to ensure safety, and are familiar with planned procedures for dealing with emergencies;
- Assuring all field personnel have a minimum of 24 hours training;
- 4. Assuring that personnel are aware of the potential hazards associated with site operations;
- 5. Monitoring the safety performance of all personnel to ensure that the required work practices are employed;
- 6. Correcting any work practices or conditions that may result in injury or exposure to hazardous substances;
- 7. Preparing any accident/incident reports (see attached Accident Report Form); and
- 8. Assuring the completion of Plan Acceptance and Feedback Forms attached hereto.

3.3 SITE SAFETY OFFICER

The Site Safety Officer (SSO) shall:

- 1. Implement project Health and Safety Plans, and report any deviations from the anticipated conditions described in the plan.
- 2. Ensure that all monitoring equipment is calibrated on a daily basis and that the results are properly recorded and filed. (See Appendix for Daily Calibration Check Sheet)
- 3. Ensure monitoring equipment is operating correctly and provide for maintenance if it is not.
- 4. Assume any other duties as directed by the PM, WRHSO (in the Western Region), and the FWHSO.

5. Be responsible for identifying all WMS site personnel with special medical problems.

3.4 PROJECT PERSONNEL

Project personnel involved in onsite investigations and operations are responsible for:

- 1. Taking all reasonable precautions to prevent injury to themselves and to their fellow employees; and
- 2. Performing only those tasks that they believe they can do safely, and immediately reporting any accidents and/or unsafe conditions to the SSO or PM.
- 3. Implementing the procedures set forth in the Health and Safety Plan, and reporting any deviations from the procedures described in the Plan to the SSO or PM for action.
- 4. Notifying the PM and SSO of any special medical problems (i.e., allergies) and insuring that all on-site personnel are aware of any such problems.

4.0 BACKGROUND

4.1 SITE HISTORY

Monsanto's Duwamish Plant is located on the east side of the Duwamish Waterway just north of slip NO. 6. The site is roughly trapezoidal in shape and is bounded on the east by East Marginal Way South, and on the North by Kenworth Truck Company property. The plant process is primarily the manufacture of vanillin from spent sulfite liquor and other raw materials. The plant facilities include temporary storage for raw materials, products and waste, and waterway, railroad and roadway access to the plant. Monsanto's Duwamish facility has been operated by Monsanto for approximately forty years. Prior to that time, Laucks Chemicals operated an adhesive manufacturing facility at the site. Many of the existing buildings at the site were a part of Laucks' or earlier operations. Specific information regarding the raw materials, processes, wastes, and waste disposal practices of Laucks' adhesives operation are not known.

Monsanto's past operations include dry glue and resins operations, as well as the ongoing vanillin production. Information provided by Monsanto indicates that the raw materials for dry glue operation, discontinued in 1971, were different and separate from those of the past and present vanillin production operation.

The primary product of the present operation is vanillin. A secondary product, which is actually a by-product of the vanillin production, is VBLS. VBLS is used in the manufacture of cement and is sold as a fuel by Monsanto.

Waste products of the past dry glue operation are not specifically

known. We understand that they were trucked off the site for disposal at an unspecified location. It is possible that waste handling procedures, as well as raw materials and product handling, during the dry glue operation created potential sources or avenues of contamination.

The waste materials and handling practices of both the past and present vanillin production operations are better known. The waste materials of the vanillin production consist of VSB tars, autoclave scale, and strainer solids. We understand that strainer solids are very similar in composition to VBLS.

Other wastes are developed from maintenance operations. Both waste lubricating oil and transformer and capacitor fluid, none containing polychlorinated biphenyls (PCBs), are disposed off site.

We understand that the only long-term disposal of waste on site included landfilling autoclave scale on the property immediately north of the plant site, now occupied by Kenworth Truck Company but previously owned by Monsanto. This landfilling occurred approximately between 1952 and 1962. Between approximately 1953 and 1963, guaiacol and oil in liquid form were disposed at the current location of the caustic (sodium hydroxide) storage tanks in the southwest corner of the plant site.

Single occurrence waste disposals occurred in 1969 and 1979 at two different locations just west of the existing laboratory building. In 1969, accumulated solids from a sulfuric acid tank were buried in a pit excavated for that purpose; and, in 1979, an unknown quantity of VBLS was dumped on the ground surface in an unpaved area.

4.2 DAMES & MOORE ACTIVITY

Dames & Moore field activities will consist of drilling (cable tool method) and inbstallation of monitoring wells; acetylene torches will be used to cut steel casing; saws will be utilized as required to cut through concrete; soil sampling (hand held auger) and water sampling

4.3 SUSPECTED HAZARDS

The suspected hazards will be those compounds associated with the production of Vanillin. More specifically:

- 4.3.1 Vanillin Inhalation and dermal contact are expected to be the primary routes of occupational exposure to vanillin. Occupational exposure to this material has not been reported to cause significant adverse human health effects when recommended safety precautions are followed.
- 4.3.2 Vannilin Black Liquor Due to the high pH (12.5 13.2) of this material, eye irritation may occur if contact occurs. Precautions are recommended to avoid contact with eyes.
- 4.3.3 Vanillin Black Liquor Solids This material does not appear to

- have any toxicologic properties which would require special handling other than normal good practices in handling any industrial chemical.
- 4.3.4 Vanillin Still Bottoms This material does not appear to have any toxicologic properties which would require special handling other than normal good practices in handling any industrial chemical.
- 4.3.5 Monsize Paper Sizing Agent Reports in the literature indicate that sensitization and allergic skin reactions may occur in humans following exposure to tall oil rosin and rosin acids. Precautions to limit skin contact are recommended.
- 4.3.6 Santicizer 148 Plasticizer Results of toxicological investigations indicate that this material is neither an irritant nor a sensitizing agent. This material does not appear to have properties which would require special handling other than normal good practices.
- 4.3.7 Santicizer 711 Plasticizer This material is largely mixed phthalate esters. In general, phthalate esters have a very low order of toxicity ranging from slightly toxic to relatively harmless; however at high doses, decreased liver function could result. Evaluation of this material indicates that it is not a primary irritant or a sensitizing agent and can be handled safely if recommended practices are followed.
- 4.3.8 Machete Herbicide Butachlor is the active agent in this herbicide. Dermal contact and inhalation are expected to be the primary routes of occupational exposure to this material. Contact has been reported to cause dermal irritation. Information also indicates that repeated contact may cause allergic skin reaction in susceptible individuals. The solvent for this material is a mix of xylene, trimethylbenzene and C-9 aromatics and may cause eye, skin, and respiratory tract irritation.
- 4.3.9 Various Formaldehyde Resins Dry glue and resins have been produced at this plant and the associated materials may include phenols, resorcinol, and urea. In addition, there may be some cresilic resins.
- 4.3.10 Polychlorinated biphenyl There may be some polychlorinated biphenyl-containing hydraulic fluids on the site (Skydrol/Pydraul).
- 4.3.11 Miscellaneous Carbon tetrachloride, carbon disulfide, sodium hydroxide, toluene.

5.0 EMERGENCY CONTACTS AND PROCEDURES

5.1 CONTACTS

Should any situation or unplanned occurrence require outside or support services, the appropriate contact from the following should be made:

Agency	Person to Contact	Telephone
Police	Dispatcher	911
Fire	Dispatcher	911
Ambulance	Dispatcher	911
Hospital (1)	Harborview	223-3000
D & M PM	Dennis Goldman	(Office) 206-523-0560 (Home) (b)(6)
WRHSO	Joe Darcy	(Office) 206-523-0560 (Home) (b)(6)
D & M SSO	Ching-Pi Wang	(Office) 206-523-0560 (Home) (b)(6)
	Kent Trotman	(Office) 206-523-0560 (Office) 206-337-3926
Client Contact	B.L. Podrabsky	(Office) 206-764-4450 (Home) (b)(6)

5.2 PROCEDURES

In the event that an emergency develops onsite, the procedures described below are to be immediately followed. Emergency conditions are considered to exist if:

- * Any member of the field crew is involved in an accident or experiences any adverse effects or symptoms of exposure while onsite; or
- * A condition is discovered that suggests the existence of a situation more hazardous than anticipated.

The following emergency procedures should be followed:

1. Personnel onsite should use the "buddy" system (pairs).

⁽¹⁾ Directions to the hospital are on Map in Appendix.

Emergency Alarms & Phone Numbers

9229 E. Marginal Way South • 9200 Block E. Marginal Way S. & Barton Street 764-4450

ALARMS

IRE - Turn in Alarm from ADT B	OX
\DT	624-3106
King County (Duwamish)	852-2121

?LANT EMERGENCY

ial 4492 —	Wait for tone to stop
Dial: 1-2-3-1	To Page
1-2-3-2	To Disconnect PA
1-2-3-3	To Sound Alarm
1-2-3-4	To Silence Alarm

DOCTOR

Dr. B.R. Harris	***************************************	329-1760
oly Clinic		

Pr. Harris cannot be reached, ask for the followg doctors in the order listed below until one is practed:

Dr.	J.J. Lane		329-1760
٦r.	A.M. Sh	afer	329-1760

wring off shift and weekend hours, the y Clinic answering service will make contact the physician.

EMERGENCY CALLS

Shepard Ambulance		322-	0330
Fire	Eme	ergency	/!Dial
King County Sheriff			
First Aid			J
Rescue		e Fire M	ledical
Providence Hospital Emergency R	oom	326-	5691
Harborview Hospital		223-	3000
Seattle City Light		625-	3000
Washington Natural Gas Co		622-	6767
Water Dept	••••	625-	4185

PLANT PERSONNEL

R.E. Rhoades(b) (6)
W.E. Bowers
F.H. Emme
B.S.K. Fung
G.D. Graves
R.H. Bleikamp
P.E. Martin
M.N. Miller
J.L. Nichols
B.E. Pallante
G.L. Podrabsky
T.B. Rahier
J.R. Danielson
J

Buddies should prearrange hand signals or other means of emergency signals for communications in case of lack of radios or radio breakdown. The following hand signals are suggested:

- * Hand gripping throat: out of air; can't breathe.
- * Grip partner's wrist or place both hands around waist: leave area immediately, no debate!
- * Hands on top of head: need assistance.
- * Thumbs up: okay; I'm alright; I understand.
- * Thumbs down: no; negative.
- 2. The PM will establish emergency evacuation routes and will make all project personnel aware of these routes prior to the first onsite activities. In the event of an emergency, selection of the escape route will be based on the nature of the emergency and wind direction.
- 3. Visual contact should be maintained between "pairs" onsite, with the team remaining in close proximity in order to assist each other in case of emergencies.
- 4. In the event that any member of the field crew experiences any adverse effects of symptoms of exposure while on site, the entire field crew should immediatley halt work and act according to the instructions provided by the PM or SSO.
- 5. Wind indicators visible to all onsite personnel should be provided by the PM to indicate possible routes for upwind escape.
- 6. The discovery of any condition that would suggest the existence of a situation more hazardous than anticipated should result in the evacuation of the field team and re-evaluation of the hazard and the level of protection required.
- 7. In the event that an accident occurs, the PM is to complete an Accident Report Form for submittal to the Office Safety Coordinator (OSC)), who will forward a copy to the Western Region Health and Safety Officer (WRHSO) and the Firmwide Health and Safety Officer (FWHSO). The OSC should assure that the follow-up action is taken to correct the situation that caused accident.

6.0 HAZARD CHARACTERISTICS, MONITORING METHODS, AND PROTECTION REQUIRED

6.1 EXPOSURE LIMITS AND RECOGNITION QUALITIES

Information concerning exposure limits and recognition qualities of the contaminants that are suspected to be on the site is presented in Table 1 in the Appendix.

- 6.2 SYMPTOMS OF OVEREXPOSURE, POTENTIAL CHRONIC EFFECTS AND FIRST AID TREATMENT
- Symptoms of overexposure to the suspected contaminants, potential chronic effects of these substances and first aid treatment information is presented in Table 2 in the Appendix.
- 6.3 MONITORING METHODS, ACTION LEVELS AND PROTECTIVE MEASURES

Methods for monitoring for suspected contaminants, action levels and protective measures to be used for various contaminant concentration levels are presented in Table 3 in the Appendix.

6.4 PROTECTIVE EQUIPMENT REQUIRED FOR ONSITE ACTIVITIES

The protective equipment required may vary, dependent on the concentrations and dispersion of contaminants encountered during each phase of the work. Table 4 in the Appendix, specifies protective equipment required for each onsite activity.

NOTE: As additional tasks are designated, the level of protection required will be developed by the SSO and approved by the OSC prior to any activity at the site.

7.0 STANDARD SAFE WORK PRACTICES

7.1 GENERAL

- 1. Eating, drinking, chewing gum or tobacco and smoking are prohibited in the contaminated or potentially contaminated area of where the possibility for the transfer of contamination exists.
- 2. Avoid contact with potentially contaminated substances. Do not walk through puddles, pools, mud, etc. Avoid, whenever possible, kneeling on the ground, leaning or sitting on equipment or ground. Do not place monitoring equipment on potentially contaminated surface (i.e., ground, etc.).
- 3. All field crew members should make use of their senses (all senses) to alert them to potentially dangerous situations in which they should not become involved (i.e., presence of strong, irritationg or nauseating odors).
- 4. Prevent, to the extent possible, spillages. In the event that a spillage occurs, contain liquid if possible.

- 5. Prevent splashing of the contaminated materials.
- 6. Field crew members shall be familiar with the physical characteristics of investigations, including:
 - * Wind direction in relation to ground-zero area;
 - * Accessibility to associates, equipment, vehicles;
 - * Communications;
 - * Hot zone (areas of known or suspected contamination);
 - * Site access; and
 - * Nearest water sources.
- 7. The number of personnel and equipment in the contaminated area should be minimized but only to the extent consistent with workforce requirements of safe site operations.
- 8. All wastes generated during Dames & Moore and/or subcontractor activities at the site will be disposed of as directed by the PM.

7.2 DRILLING AND SAMPLING PRACTICES

For all drilling and sampling activities, the following standard safety procedures shall be employed:

- 1. All drilling and sampling equipment should be cleaned before proceeding to the drill site.
- 2. At the drill or sampling site, sampling equipment should be cleaned after each use.
- Work in "cleaner" areas should be conducted first where practical.
- 4. The minimum number of personnel necessary to achieve the objectives shall be within 25 feet of the drilling or sampling activity.
- 5. If emergency and backup subcontracted personnel are at the site, they should remain 25 feet from the drilling or sampling activity, where practical.
- 6. Exclusion zones will be established within designated hot lines. Delineation of a hot line will reflect the interface between areas at and below a predetermined threshold contaminant concentration, based on available data including the results of monitoring and chemical analyses, information from site personnel regarding

historical site activities, and general observations. This determination will be made by the PM in conjunction with the SSO and site personnel.

7. All unauthorized personnel will remain outside exclusion zones at all times.

8.0 RESPIRATOR INSTRUCTIONS

8.1 FULL-FACE RESPIRATOR

8.1.1 Inspection Procedures

- 1. Inspection to be done daily prior to arrival at the site.
- Look at the shape of the facepiece for possible distortion that may occur if it is not protected during storage.
- 3. Check the facepiece for dirt, cracks, tears or holes. The rubber should be flexible, not stiff. Also check the lens for cracks.
- 4. All straps and buckles must be attached. Check straps for elasticity and worn serrations.
- 5. Check the exhalation valve located near the chin between the cartridges:
 - a. Unsnap the cover.
 - b. Lift the valve and inspect the seat and valve for cracks, tears, dirt and distortion.
 - c. Replace the cover. It should spin freely.
- 6. Check both inhalation valves (inside the cartridge holders). Look for same signs as above.
- 7. Make sure the cartridge holders are clean. Make sure the gaskets are in place and the threads are not worn. Also look for cracks and other damage.
- 8. Check the cartridges for dents or other damages, especially in the threaded part.

8.1.2 Donning Procedures

1. Screw the cartridge into the holder hand tight so there is a good seal with the gasket in the bottom of the holder, but don't force it. If the cartridge won't go in easily, back it out and try again.

Always use cartridges made by the same manufacturer who made the respirator.

- 2. Fold the straps back over the window piece.
- 3. Hold the facepiece with one hand and the strap piece (in front of the window) with the other.
- 4. Put your chin in first. Lift the strap piece out and over your head.
- 5. To tighten the straps, use both hands, one on each side and pull straight back--not out. Tighten side bottom straps first then top side straps and finally top strap.
- 6. Test the fit:
 - a. Lightly cover the exhalation valve with the palm of your hand. Exhale...if there is a leak, you will feel the air on your face.
 - b. Cover the cartridge with the palms of your hands. Again, don't press too hard. Inhale...the face-piece should collapse against your face.
 - c. If there is a leak with either test, adjust the headbands or reposition the facepiece and test until no leakage is detected.

8.1.3 Sanitizing Procedures

- Remove all cartridges plus seals not affixed to their seats.
- 2. Remove elastic headbands.
- 3. Remove exhalation cover.
- 4. Remove speaking diaphragm or speaking diaphragm-exhalation valve assembly.
- 5. Remove inhalation valves.
- 6. Wash facepiece and breathing tube in cleaner/sanitizer powder mixed with warm water, preferably at 120 to 140 degrees F. Wash components separately from the facemask, as necessary. Remove heavy soil from surfaces with a hand brush.
- 7. Remove all parts from the wash water and rinse twice in clean warm water.
- 8. Air-dry parts in a designated clean area.
- 9. Wipe facepieces, valves, and sets with a damp lint-free cloth to remove any remaining soap or other foreign

materials.

8.2 HALF-FACE RESPIRATOR

8.2.1 Inspection Procedures

- Look for breaks or tears in the headband material; also stretch to check the elasticity.
- 2. Make sure all headbands, fasteners and adjusters are in place and not bent.
- Check the facepiece for dirt, cracks, tears or holes.
 The rubber should be flexible, not stiff.
- 4. Look at the shape of the facepiece for possible distortion that may occur if the respirator is not protected during storage.
- 5. Check the exhalation valve located near the chin between the cartridges.
 - a. Unsnap the cover.
 - b. Lift the valve and inspect the seat and valve for cracks, tears, dirt or distortion.
 - c. Replace the cover. It should spin freely.
- 6. Check both inhalation valves (inside the cartridge holders). Look for same signs as above.
- 7. Check the yoke for cracks.
- 8. Make sure the cartridge holders are clean. Make sure the gaskets are in place and the threads are not worn. Also look for cracks and other damage.
- 9. Check the cartridges for dents or other damage, especially in the threaded part.

8.2.2 Donning Procedures

1. Screw the cartridge into the holder hand tight so that there is a good seal with gasket in the bottom of the holder, but don't force it. If the cartridge won't go in easily, back it out and try again.

Always use cartridges made by the same manufacturer who made the respirator.

- 2. Place the facepiece over the bridge of your nose and swing the bottom in so that it rests against your chin.
- 3. Hold the respirator in place and fasten the top strap over the crown of your head.

4. Fit the respirator on your face and fasten the strap around your neck. Don't twist the straps. Use the metal slide to tighten or loosen the fit (don't overtighten).

5. Test the fit:

- a. Lightly cover the exhalation valve with the palm of your hand. Exhale...if there is a leak, you will feel air on your face.
- b. Cover the cartridges with the palms of your hands. Again, don't press too hard. Inhale... the face-piece should collapse against your face.
- c. If there is a leak with either test, adjust the headbands or reposition the facepiece and test test until no leakage is detected.

8.2.3 Sanitizing Procedures

- Remove all cartridges and seals not affixed to their seats.
- 2. Remove elastic headbands.
- 3. Remove exhalation cover.
- 4. Remove speaking diaphragm or speaking-exhalation valve assembly.
- 5. Remove inhalation valves.
- 6. Wash facepiece and breathing tube in cleaner/sanitizer powder mixed with warm water, preferably at 120 to 140 degrees F. Wash components separately from the facemask, as necessary. Remove heavy soil from surfaces with a hand brush.
- 7. Remove all parts from the wash water and rinse twice in clean warm water.
- 8. Air-dry parts in a designated clean area.
- 9. Wipe facepieces, valves, and seats with a damp lintfree cloth to remove any remaining soap or other foreign materials.

9.0 MONITORING EQUIPMENT OPERATING INSTRUCTIONS

9.1. COLORIMETRIC INDICATOR TUBES AND PUMPS (DRAEGER)

In addition to the instructions found below, a set of instructions

specific to the tubes is provided in each box of colorimetric indicator tubes. These instructions should be referred to and followed.

All colorimetric indicator tubes and and pumps should be field calibrated prior to use. This calibration tests for leaks in the following manner:

- 1. Insert unbroken tube into pump's tube holder.
- 2. Squeeze bellows on bellows-type pump. After 60 seconds, bellow should not regain its original shape or chain should not be taut.
- 3. Pull back and lock handle on piston-type pump.
- 4. Rotate handle 1/4 turn. Handle should return to within 1/4 inch of zero cc mark.

If pump fails these tests, it should be serviced according to manufacturer's instructions.

NOTE: Be sure to record results.

9.1.1 Draeger Indicator Tube Pump

- Break off both tips of a fresh colorimetric indicator tube in break-off eyelet on front cover plate or in break-off husk (an accessory).
- 2. Insert tube into pump head with arrow on tube pointing towards pump.
- 3. Hold pump with holding plate between thumb and the base of index finger and front cover plate contacting finger.
- 4. Compress the bellows completely with a squeezing motion, assuring that total volume of bellows is used.
- 5. Release grip and allow chain to become taut, signifying that 100 cc of air has been pulled through tube.
- 6. Complete steps 4 and 5 as many times as tube°s instructions state.
- 7. Read concentration of material in air at stained-unstained interface.

9.2 TLV SNIFFER

9.2.1 Battery Check

1. Turn MODE selector knob from OFF position to BATT TEST position. The meter pointer should come to rest in the BATTERY GOOD range of the scale.

9.2.2 Setting Meter Pointer To Zero

- 1. Attach the air sampling probe connector to the instrument intake on the left side of the case by pulling back the spring collar of the connector and pressing the connector over the intake.
- 2. Place the instrument in the position in which the meter indication will be read.

NOTE: Heat distribution from active and reference fillaments of the detector sensor changes from vertical to horizontal position. The resulting change in electrical balance between elements causes a shift in pointer zero from one position to the other.

- Set MODE SELECTOR switch to PPM x 100 and operate the instrument for 10 minutes to allow the circuits to stabilize.
- 4. In fresh air, set the ZERO ADJUST knob at the midpoint (five full turns from either extreme position).
- 5. Turn the coarse adjustment screw to move the meter pointer to zero on the meter scale.
- 6. Turn the MODE SELECTOR switch to the PPM x 10 position and turn the ZERO ADJUST knob to set the pointer to zero.
- 7. Turn the MODE SELECTOR switch to the PPM x 1 position and turn the ZERO ADJUST knob to set the pointer to zero.

9.2.3 Operation

- 1. Turn the MODE SELECTOR control knob to BATT TEST position and read the condition of the battery on the meter dial. Recharge batteries if necessary. NOTE: Do not recharge unless the battery is almost completely discharged.
- 2. Turn the MODE SELECTOR control to the desired operating range.
- 3. Allow a ten minute warmup period with the instrument in same position (orientation) as it is to be used in service.
- 4. Read and record the results.

9.3 EXPLOSIMETER

In addition to the inistructions found below, all explosimeters should be calibrated according to instructions prior to use, in a noncontaminated, fresh air environment. Furthermore, units incorporating as aspirator bulb or other air-drawing device should be checked for leaks in the following manner.

- Attach all hoses, probes, and other air-drawing devices explosimeter.
- 2. Place a finger over probe or hose end.
- 3. Operate pump or squeeze aspirator bulb.

In a leak free system, bulb remains collapsed or pump labors. In a leaking system, bulb regains its shape or pump does not labor.

9.3.1 MSA Explosimeter

- 1. Turn explosimeter on by lifting end of "on-off" bar on "rheostat" knob and rotating rheostat knob clockwise 1/4 turn.
- 2. Flush instrument with fresh air by squeezing and releasing aspirator bulb about five times.
- 3. Rotate rheostat knob until meter needle rests at zero. (Avoid large clockwise rotation, which sends large current through filament, perhaps shortening its useful life.)
- 4. To sample, place hose or probe end in atmosphere to be measured and operate aspirator bulb about five times.
- 5. Read percent of lower explosive limit (LEL) as meter needle fluctuates from steady-state level to a higher level each time the aspirator bulb is flexed. The steady-state reading indicates the "true" value.
- 6. Turn Explosimeter off by lifting of on-off bar on rheostat knob and rotating it counterclockwise until it clicks. On-off bar retracts into rheostat knob.

Monsanto Company 104(e) Response 10.0 DECONTAMINATION PROCEDURES

10.1 MINIMUM DECONTAMINATION

10.1.1 Personnel

A personnel decontamination station will be set up outside of the restricted zone. All personnel leaving this area will:

- 1. Rinse boots.
- 2. Remove disposable clothing (coveralls, gloves, etc., as described in training session) and place in garbage bag.
- 3. Dispose of garbage in designated receptacle.
- 4. Use good common sense.

NOTE; All protection gear should be left onsite during lunch break, etc., following decontamination procedures. Protection gear, whether or not contaminated, should not be worn in public.

10.1.2 Minimum Decontamination

Less extensive procedures for decontamination can be subsequently or initially established when the type and degree of contamination becomes known or the potential for transfer is judged to be minimal. These procedures generally involve one or two washdowns only. The layout for a minimal decontamination operation is shown in the attached diagram.

10.1.3 Closure of the Personnel Decontamination Station

All disposable clothing and plastic sheeting used during the operation should be double-bagged and either contained onsite or removed to an approved offsite disposal facility.

Decon and rinse solutions should be discarded onsite or removed to an approved disposal facility.

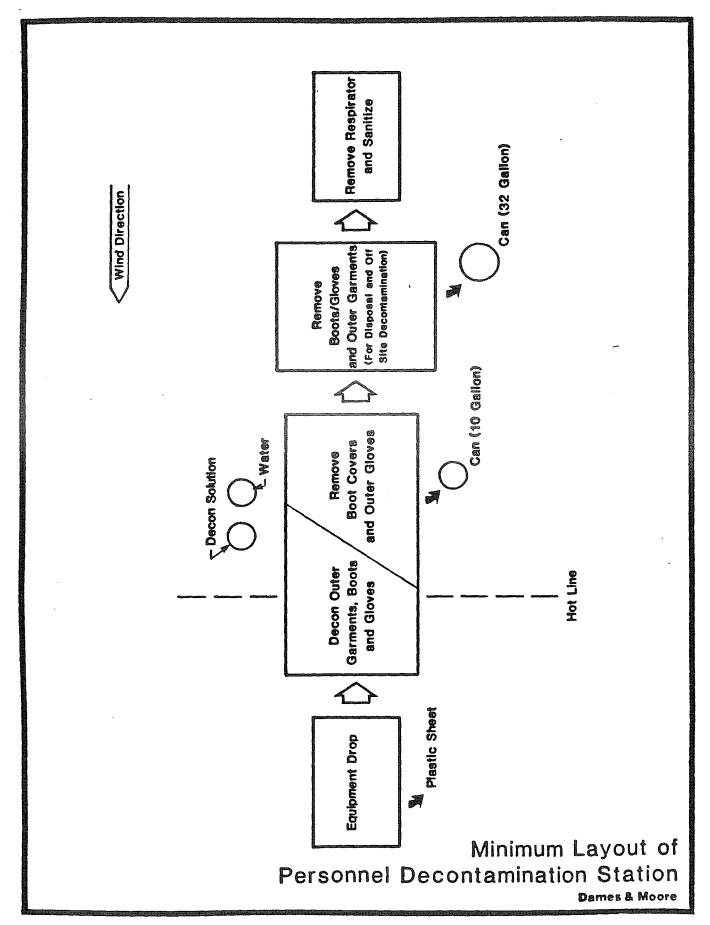
Reuseable rubber clothing should be dried and prepared for future use. (If gross contamination has occurred, additional decontamination of these items may be required.)

Cloth items should be bagged and removed from the site for final cleaning.

All washtubs, pail containers, etc. should be thoroughly washed, rinsed, and dried prior to removal from the site.

10.1.4 Vehicles

- 1. Rinse all vehicles which have entered the active site.
- Vacuum vehicles thoroughly daily, or more frequently if needed.



10.1.5 Equipment

- 1. Clean all equipment prior to proceeding to site.
- 2. At the site, clean equipment after each use.
- 3. Clean equipment thoroughly prior to leaving the site.

11.0 SAMPLE SHIPPING

Samples collected should be classified as either environmental or hazardous material (or waste) samples. In general, environmental samples are collected offsite from streams, ponds, or wells and are not expected to be grossly contaminated with high levels of hazardous materials. Onsite samples (i.e., soil, water, and materials from drums or bulk storage tanks, obviously contaminated ponds, lagoons, pools, or leachates from hazardous waste sites) are considered hazardous material samples. A distinction must be made between the two types of samples in order to:

- 1. Determine appropriate procedures for transportation of samples. If there is any doubt, a sample should be considered hazardous and shipped accordingly.
- 2. Protect the health and safety of laboratory personnel receiving the samples. Special precautions are used at laboratories when samples other than environmental samples are received.

The sample tag should be legibly written and completed with an indelible pencil or waterproof ink. The information should also be recorded in a log book. As a minimum, it should include:

- 1. Exact location of sample;
- 2. Time and date sample was collected;
- 3. Name of sampler and witnesses (if necessary);
- 4. Project codes, sample station number, and identifying code (if necessary);
- 5. Type of sample (if known);
- 6. Tag number (if sequential tag system is used);
- 7. Laboratory number (if applicable); and
- 8. Any other pertinent information.

11.1 ENVIRONMENTAL SAMPLES

Environmental samples must be packaged and shipped according to the following procedure:

1. Place sample container, properly identified and with a sealed

lid, in a polyethylene bag, and seal bag.

- 2. Place sample in a fiberboard container or metal picnic cooler which has been lined with a large polyethylene bag.
- 3. Pack with enough noncombustible, absorbent, cushioning material to minimize the possibility of the container breaking.
- 4. Seal large bag.
- 5. Seal or close outside container.

Environmental samples may also be packaged following the procedures outlined later for samples classified as "flammable liquids" or "flammable solids". Requirements for marking, labeling, and shipping papers do not apply.

11.1.2 Marking/Labeling

Sample containers must have a completed sample identification tag and the outside container must be marked "Environmental Sample". The appropriate side of the container must be marked "This End Up" and arrows should be drawn accordingly. No DOT marking and labeling is required.

11.1.3 Shipping Papers

No DOT shipping papers are required.

11.1.4 Transportation

There are no DOT restrictions on mode of transportation.

11.2 HAZARDOUS MATERIAL SAMPLES

Samples known or expected to contain hazardous materials must be considered hazardous substance samples and transported according to the following requirements:

- 1. If the material in the sample is known or can be identified, package, mark, label, and ship according to the specific instructions for that material (if it is listed) in the DOT Hazardous Materials Table (see Appendix), 49 CFR 172.101.
- 2. For samples of hazardous substances of unknown content, select the appropriate transportation category according to the DOT Hazardous Maerials Classification Table (see Appendix), a priority system of transportation categories.

11.2.1 Sample Classification

The correct shipping classification for unknown samples is selected through a process of elimination, utilizing the DOT classification system. Unless known or demonstrated otherwise (through the use of radiation survey instruments), the sample is considered radioactive

and appropriate shipping regulations for "radioactive material" followed.

If the radioactive material is eliminated, the sample is considered "Poison A" as extremely dangerous poisonous gases or liquids of such a nature that a very small amount of gas, or vapor of the liquid, mixed with air is dangerous to life.

Many Poison A materials are gases or compressed gases and would not be found in drum-type containers. Liquid Poison A's would probably be found only in closed containers. All samples taken from closed drums do not have to be shipped as Poison A's. Based upon information available, a judgment must be made whether a sample from a closed container is a Poison A.

If Poison A is eliminated as a shipment category, the next two classifications are "flammable" or "nonflammable" gases. Since few gas samples are collected, "flammable liquid" would be the next applicable category. With the elimination of radioactive material, Poison A, flammable gas, and nonflammable gas, the sample can be classified as flammable liquid (or solid) and shipped accordingly. These procedures would also suffice for shipping any other samples classified below flammable liquids in the DOT classification table.

For samples containing unknown material, other categories listed below flammable liquids/solids on the table are generally not considered because eliminating other substances as flammable liquids requires flashpoint testing, which may be impractical and possibly dangerous at a site. Thus, unless the sample is known to consist of material listed below flammable liquid on the table, it is considered a flammable liquid (or solid) and shipped as such.

11.3 SAMPLES CLASSIFIED AS FLAMMABLE LIQUID (OR SOLID)

Applying the word "flammable" to a sample does not imply that it is in fact flammable, or how flammable. The word prescribes the class of packaging according to DOT regulations. The procedures for shipping flammable material are:

- 1. Collect sample in a glass container with nonmetallic, teflon lined screw cap. To prevent leakage, fill container no more than 90 percent full at 130 F. If an air space in the sample container would affect sample integrity (i.e., no headspace is maintained for volatiles), place that container within a second container to meet 90 percent requirement.
- 2. Complete sample identification tag and attach securely to sample container.
- 3. Seal container and place in 2-mil thick (or thicker) polyethylene bag, one sample per bag. Position identification tag so it can be read through bag. Seal bag.
- 4. Place sealed bag inside metal can and cushion it with enough noncombustible, absorbent material (for example, vermiculite

or diatomaceous earth) between the bottom and sides of the can and bag to prevent breakage and absorb leakage. Pack one bag per can. Use clips, tape, or other positive means to hold can lid securely, tightly and permanently.

5. Place one or more metal cans (or single 1-gallon bottle) into a strong outside container, such as a metal picnic cooler or a DOT-approved fiberboard box. Surround cans with noncombustible absorbent, cushioning material for for stability during transport.

11.3.2 Marking/Labeling

- 1. Use abbreviations only where specified.
- 2. Place following information, either hand-printed or in label form, on the metal can (or 1-gallon bottle).

Laboratory Name and Address "Flammable Liquid, n.o.s. UN1993" or "Flammable Solid, n.o.s. UN1325."

Not otherwise specified (n.o.s.) is not used if the flammable liquid (or solid) is idientified. Then the name of the specific material is listed before the category (for example, Acetone, Flammable Liquid) followed by its appropriate UN number found in the DOT Hazardous Materials Table (172.101).

- 3. Place the following DOT labels (if applicable) outside of can (or bottle).
 - a. "Flammable Liquid" or "Flammable Solid".
 - b. "Dangerous When Wet." Must be used with "Flammable Solid" label if material meet sthe definition of a water-reactive material.
 - c. "Cargo Aircraft Only." Must be used if net quantity of sample in each package is greater than 1 quart (for "Flammable Liquid, n.o.s.") or 25 pounds (for "Flammable Solid, n.o.s.).
- Place all information on outside shipping container as on can (or bottle).
- 5. Print "Laboratory Samples" and "This End Up" or "This Side Up" clearly on top of shipping container. Put upward pointing arrows on all four sides of container.

11.3.3 Shipping Paper

- 1. Use abbreviations only where specified.
- 2. Complete carrier-provided bill of lading and sign certification statement (if carrier does not provide, use

standard industry form). Provide the following information in the order listed. (One form may be used for for more than one exterior container.)

- a. "Flammable Liquid, n.o.s. UN1993" or "Flammable Solid, n.o.s. UN1325".
- b. "Limited Quantity" (or "Ltd. Qty.").
- c. Net weight or net volume (weight or volume may be abbreviated) just before or just after "Flammable Liquid, n.o.s." or "Flammable Solid, n.o.s."
- d. Further descriptions such as "Laboratory Samples" or "Cargo Aircraft Only" (if applicable) are allowed if they do not contradict required information.
- Include chain-of-custody record, properly executed, in outsid container if legal use of samples is required or anticipated.

11.3.4 Transportation

- 1. Transport unknown hazardous substance samples classified as flammable liquids by rented or common carrier truck, railroad, or express overnight package services.
- 2. Do not transport by a passenger-carrying air transport systems, even if they have cargo-only aircraft. DOT regulations permit regular airline cargo-only aircraft, but but difficulties with most suggest avoiding them. Instead Instead, ship by airlines that only carry cargo.
- 3. Transport by government-owned vehicle, including aircraft. DOT regulations do not apply, but EPA personnel will still use procedures described except for execution of the bill of lading with certification.

11.3.5. Other Considerations

- Check with analytical laboratory for size of sample to be collected and if sample should be preserved or packed in ice.
- 2. For overnight package services, determine weight restrictions at least one service limits weight to 70 pounds per package.

11.4 SAMPLES CLASSIFIED AS POISON "A"

Applying the word "poisonous" to a sample does not imply that it is in fact poisonous, or how poisonous. It describes the class of packaging according to DOT regulations. The procedures for shipping "poisonous" materials are:

- 1. Collect samples in a polyethylene or glass container with an outer diameter narrower than the valve hole on a DOT specification #3A1800 metal cylinder. To prevent leakage fill container no more than 90% full (at 130 F).
- 2. Seal sample container.
- 3. Complete sample identification tag and attach securely to sample container.
- 4. Attach string or flexible wire to neck of the sample container; lower it into metal cylinder partially filled with noncombustible, absorbent cushioning material (i.e. diatomaceous earth or vermiculite). Place only one container in a metal cylinder. Pack with enough absorbing material between the bottom and sides of the sample container and the metal cylinder to prevent breakage and absorb leakage. After the cushioning material is in place, drop the end of the string or wire into the cylinder valve hole.
- 5. Replace valve and replace valve protector on metal cylinder, using teflon tape.
- 6. Place one or more cylinders in a DOT-approved outside container.

11.4.2 Marking/Labeling

- 1. Use abbreviations only where specified.
- 2. Place following information, either hand-printed or in label form, on the side of the cylinder or on tag wired to the cylinder valve protector.
 - a. "Poisonous Liquid, n.o.s. NA9035" or Poisonous Gas, n.o.s. NA9035".
 - b. Laboratory name and address.
 - c. DOT label"Poisonous Gas" (even if sample is liquid) on cylinder.
- 3. Put all information on metal cylinder on outside container.
- 4. Print "Laboratory Sample" and "Inside Packages Comply With Prescribed Specifications" on top and/or front of outside container. Mark "This Side Up" on top of container and upward pointing arrow on all four sides.

11.4.3 Shipping Papers

- 1. Use abbreviations only as specified.
- 2. Complete carrier-provided bill of lading and sign certification statement (if carrier does not provide, use standard industry form). Provide following information in order

listed. (One form may be used for more than one exterior container.)

- a. "Poisonous Liquid, n.o.s. NA 9035".
- b. "Limited Quantity" (or Ltd. Qty.").
- c. Net weight or net volume (weight or volume may be abbreviated), just before or just after "Poisonous Liquid, n.o.s."
- 3. Include a chain-of-custody record, properly executed, in container or with cylinder if legal use of samples is required or anticipated.

11.4.4 Transportation

Transport unknown hazardous substance samples classified as Poison A only by ground transport or Government-owned aircraft. Do not use air cargo, other common carrier aircraft, or rented aircraft. Monsanto samples are to be classified as flammable liquid.

12.0 FORMS

The following forms are enclosed in this section:

- Calibration Check Sheet
- Plan Feedback Form
- Accident Report Form
- Exposure Form
- Plan Acceptance Form

The Plan Acceptance Form should be filled out by all employees working on the site. The Plan Feedback Form should be filled out by the Site Safety Officer and any other onsite employee who wishes to fill one out. The Accident Report Form should be filled out by the Project Manager if an accident occurs.

ALL COMPLETED FORMS SHOULD BE RETURNED TO THE OFFICE SAFETY COORDINATOR WHO WILL FORWARD THEM TO THE WRHSO.

APPENDIX

TABLE 1 LMPOSURL STANDARDS, RECOGNITION QUALITIES, FLARMABLE LIMITS

Chemical	Exposure Standard(a)	IDLH (b)	Recognition Odor	Qualities Odor Thres		
 Rashete Rerbicide	106 ppm	Unknown	Aromatic	Unknown	1.1	7
Monsize Paper Sizing Agent	Lot estb	Unknown	Rosin	Unknown	NA	$\sum_{x\in F_n} f$
Santiciser 148 Flasticiser	3 mg/m3	Unknown	Odorless	Unknown	X L	MA
Santicizer 711 Plasticizer	Not estb	Unknown	Oily	Unknown	1.2	Unli
Vanillin	15 տչ/ա3	Unknown	Vanilla	Unknown	1.71	1.4.
Vanillin Black Liquor	Not estb	Unknown	Organie	Unknown	HA	Îr fz
Vanillin Elack Liquor Boliüs	100 թթո	2000 ppn	Orjanic	Unknown	1.3	7.1

⁽a) OSAA Permissible emposure limits or ACGIM Threshold Limit Value based on an S-hour time weighted average.
(b) IDAM - Immediately dangerous to life and health.

EXPOSURE STANDARDS, RECOGNITION QUALITIES, FLAMMABLE LIMITS

Chemical	Exposure Standard(a)	IDLH (b)	Recognition Odor	Qualities Odor Thres		ume UEL
 Carbon Disulfide	10 ppm	500 ppm	Sweet	N A	1.3	 50
Carbon Tetrachloride	5 ppm	300 ppm	Ether like	21 ppm	NA	ΝA
Dibutylphthalate	5 mg/m3	9300 mg/m3	Aromatic	NA	0.5	N A
Isopropyl Alcohol	400 ppm	20,000 ppm	Alcohol	NA	2	12
Organics (NOS)	-	••	_	•••	-	~~
Pentachlorophenol	0.5 mg/m3	150 mg/m3	Pungent	Unknown	NA	N A
Polychlorinatedbi phenyl	1 mg/m3	10 mg/m3	Hydrocarbn	Unknown	?	ş
Toluene	100 ppm	2000 ppm	Aromatic	10 ppm	1.2	7.0

⁽a) OSHA Permissible exposure limits or ACGIH Threshold Limit Value based on an 8-hour time weighted average.
(b) IDLH - Immediately dangerous to life and health.

TABLL 2

POTENTIAL AFFECTS, ROUTE OF ENTRY FIRST AID TREATMENT

omenicai	ROUTE OF ENTRY I	DYE IRRITANT	PUTLATIAL ACUTE	SPYACTS OLROWIC
machete Herbicide	Inhalation Contact	medium	Irritation of the eyes, skin, respiratory tract. The solvents also can induce narcotic-like effects.	Amagerbation of acute symptoms.
Lonsize Paper Sizing Agent	Contact, Inhalation		Possible sensitization and allergic skin reactions.	of coute
Santiciser 148 Plasticiser	Inhalation Contact	Linor	Skin irritation.	Dxacerbation of acute symptoms.
Banticizer 711 Flasticizer	Inhalation contact	Minor	Possible skin irritation.	Dracerbation of serve symptoms.
Vanillin	Contact, Inhalation		Slight skin irritation.	Exacerbation of acute symptoms.
Vanillin Black Liquor	Contact (liquid)	Nedium	Eye irritation.	Exacerbation of acute symptoms.
Vanillin Black Liquor Solids ral First Aid Treatment	Inhalation contact.	Hinor	Moderate eye irritant. This Laterial contains some toluene thus symptoms may minic toluene	Exacerbation of acute symptoms

TABLE 2

POTENTIAL EFFECTS, ROUTE OF ENTRY
FIRST AID TREATMENT

CHEMICAL	ROUTE OF ENTRY I	EYE RRITANT	POTENTIAL ACUTE	EFFECTS CHRONIC
Carbon Disulfide	Inhale, Ingest, Absorption Contact	SEVERE	Dizziness, burns, fatigue, ocular changes, anorexia.	Kidney liver
Carbon Tetrachloride	Inhale, Ingest, Absorption Contact	MEDIUM	CNS depression, nausea, vomiting.	Suspected Carcinogen.
Dibutylphthalate	Inhale, Ingest, Contact	MINOR	Respiratory irritation, nausea, vertigo.	Keratitis.
Isopropyl Alcohol	Inhale, Contact	MINOR	Drowsiness, headache, confusion.	Dermatitis.
Organics (NOS)	Inhalation contact	Medium	Skin, eye and mucuous menbrane irritation, weakness, abdominal pain, nausea, vomiting, diarrhea.	Suspected to known carcinogen, teratogen, and mutagen depending on compound.
Pentachlorophenol	Contact, Inhalation	Medium	Irritation of the eyes and respiratory tract. Bronchitis. Large exposure - headache, nausea, vomit.	Weakness, loss of appetite, nausea, shortness of breath, chest pain, excessive sweating, headache.
Polychlorinatedbiphenyl	Inhalation contact	Medium	Irritation of the eyes, nose, and throat, acne-like skin rash. It may also injure the liver.	symptoms. Possibly fatigue,
Toluene	INHALATION CONTACT	MEDIUM	IRRITATION OF THE EYES, RESPIRATOR Y TRACT, AND SKIN. IT MAY ALSO CAUSE FATIGUE, WEAKNESS, HEADACHE.	DERMATITIS. POSSIBLE LIVER AND KIDNEY DAMAGE
eral First Aid Treatment yeIrrigate kinSoap wash nhalationMove to f ngestionGet medic	promptly resh air	or 15 min	utes	

TABLE 3 HAZARD, HONITONING METHOD, ACTION LEVELS PROTECTIVE MEASURES

NASAND	ACTITOTIAG METIOD	ACTION LEVLE*	PROTLUTIVE ARASURES
Rachete Herbicide	OVA orHNuor TLV Sniffer or Drager #33161	<50 ppm >50 ppm	Continue Working. Discontinue working-upgrade to MANUTE C with continued monitoring.
lonsime Paper Siming Agent	Observation	-0-	Continue working. Level B is adequate, wear appropriate impervious gloves and clothing to prevent skin contact.
Santicizer 148 Plasticizer	Observation	C	Continue working. LLVEL D is adequate for this material.
Santiciser 711 Plasticizer	Clservation	C -	Continue working. LEVEL D is adequate for this material.
Vanillin	Observation	No visible dust	Continue working. LEVEL B is adequate for this material, protection will be determined by other materials on the site.
Vanillin Elach Liquor	Observation	Kot estb	Continue working. LEVEL E is adequate for this material, upgrade will depend on other materials at the site.
Vanillin black Liquor bolids	OVA or HRU or TEV Smiffer or Prager23001	<50 ppm >50 ppm	Continue working. Discontinue working-upgrade to LEVEL C with continued monitoring.

TABLE 3

HAZARD, MONITORING METHOD, ACTION LEVELS
PROTECTIVE MEASURES

HAZARD	MONITORING METHOD	ACTION LEVEL*	PROTECTIVE MEASURES
Carbon Disulfide	PS-Charcoal or OVA/HNu/Dra ger Tube#28351	<5 ppm >5 ppm	Continue working. Discontinue working. Upgrade to Level C with continued monitoring.
Carbon Tetrachloride	PS-Charcoal or OVA/Drager Tube #27401	<2.5 ppm >2.5 ppm	Continue working. Discontinue working. Upgrade to Level C with continued monitoring.
Dibutylphthalate	PS-Filter or TLV Sniffer or OVA	<2.5 mg/m3 >2.5 mg/m3	Continue working. Discontinue working. Upgrade to Level C with continued monitoring.
Isopropyl Alcohol	Drager #29701 or TLV Sniffer or OVA	<200 ppm >200 ppm	Continue working. Discontinue working. Upgrade to Level C with continued monitoring.
Organics (NOS)	OVA or HNu or TLV Sniffer	<5 ppm >5 ppm	Continue working. Discontinue working. Upgrade to Level C with continued monitoring.
Pentachlorophenol	Observation	No visible dust Visible dust	Continue working. Direct reading instruments are not available. Upgrade to LEVEL C based on odor/observation/sympt oms.
Polychlorinatedbi phenyl	Observation	No visible dust Visible dust	Continue working. Direct reading instrument is not available - upgrade to LEVEL C based on odor/observation/sympt oms.
Toluene	TLV SNIFFER, DRAGER TUBE #23001, HNU	<50 ppm >50 ppm	CONTINUE WORKING. DISCONTINUE WORKING. UPGRADE TO LEVEL C, WITH CONTINUED MONITORING. LEAVE SITE AT 1000 PPM

TABLE 4

HAZARD, PROTECTIVE EQUIPMENT

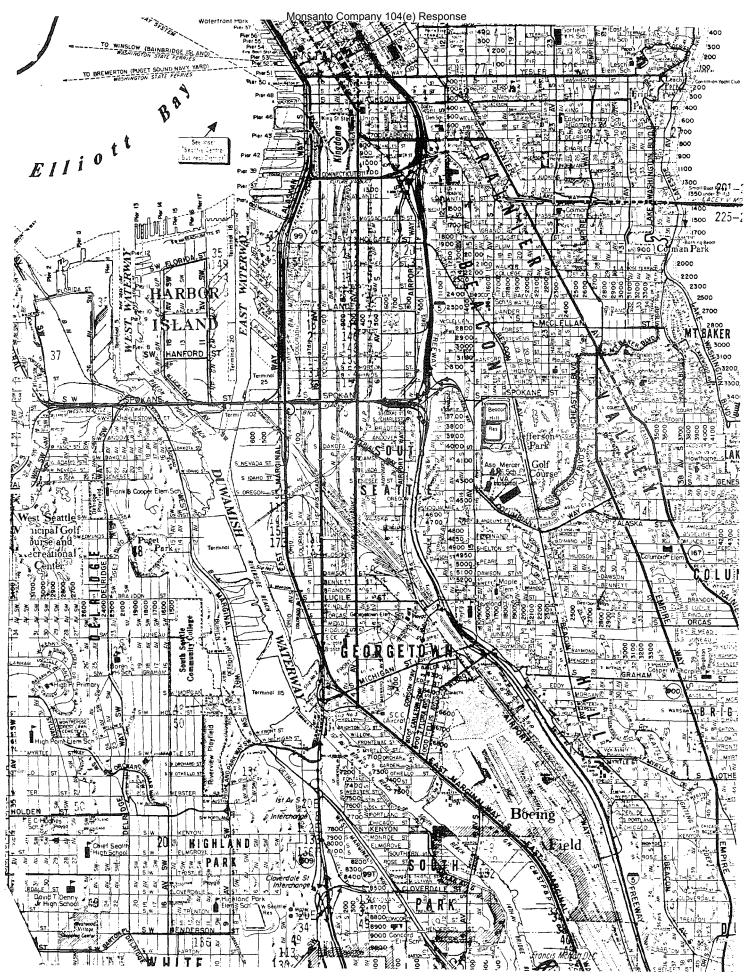
TAZALD	FOGYALOR	PROTECTIVE LQUIPHEM
hachete Herbic	ide	Mard hat, Tyvek, rubber boots, nitrile gloves, safety glasses, half or full face respirator with C.C-H cartridge.
Monsise Paper Sising Agent		Ward hat, Tyvek, rubber boots, nitrile gloves, safety glasses, full or half face respirator with organic vapor cartridge
Santicizer 140 Plasticizer		Hard hat, Tyvek, rubber boots, mitrile gloves, safety glasses, half or full face respirator with dust/mist cartridge.
Santicizer 711 Plasticizer		Hard hat, Tyvek, rubber boots, nitrile gloves, safety glasses, half or fulliace respirator with G.C-H cartriage.
Vanillin		Hard hat, Tyvek, rubber boots, nitrile gloves,
Vanillin Black Liquor		safety glasses. Hard hat, Tyvek, rubber boots, nitrile gloves, safety glasses.
Vanillin black Liquor Solids		Hard hat, Tyvek, rubber boots, nitrile gloves, safety glasses, half or full face respirator with organic vapor cartridge
following th 1) Lowest T (PT = 10	ree values: LV x Protection Pactor	based on the lowest of the (FF) cators. PF = 10 for half-mask)

TABLE 4 HAZARD, PROTECTIVE EQUIPMENT

HAZARD	LOCATION	PROTECTIVE EQUIPMENT
Carbon Disulfic	le	Hard hat, saranex, full face respirator, org vapor cartridge, gloves nitrile, steel toed rubber boots, safety glasses Hard hat, saranex, full face respirator, org vapor cartridge, gloves nitrile, steel toed rubber boots, safety glasses.
Dibutylphthalat		Hard hat, tyvek, full face respirator, org vapor cartridge, gloves nitrile, steel toed rubber boots, safety glasses. Hard hat, tyvek, full face respirator, org vapor cartridge, gloves nitrile, steel toed rubber boots, safety glasses.
Organics (NOS)		Hard hat, Tyvek, half or full face respirator with GMC-H cartridges, rubber boots, Nitrile gloves, safety glasses.
Pentachlorophen	nol	Hard hat, Tyvek, half or full face respirator with GMC-H cartridge, rubber boots, Nitrile gloves, safety glasses.
Polychlorinated phenyl	lbi	Hard hat, Tyvek, half of full face respirator with GMC-H cartridge, rubber boots, Nitrile gloves, safety glasses.
foluene		HARD HAT, TYVEK, FULL FACE RESPIRATOR WITH ORG VAPOR CARTRIDGES, STEEL TOED RUBBER BOOTS, SAFETY GLASSES, NITRILE GLOVES
ote:		
Limits of res	spirator protection is	based on the lowest of the

Limits of respirator protection is based on the lowest of the following three values:

- Lowest TLV x Protection Factor(PF)
 - (PF = 100 for full-face respirators. PF = 10 for half-mask)
- 2) Breakthrough time of the cartridge in minutes.
- 3) IDLH



Emergency Alarms & Phone Numbers

9229 E. Marginal Way South • 9200 Block E. Marginal Way S. & Barton Street 764-4450

ALARMS

IRE - Turn in Alarm from ADT Box
DT 624-3106
King County (Duwamish) 852-2121

PLANT EMERGENCY

ial 4492 —	Wait for tone to stop
Dial: 1-2-3-1	To Page
1.2.3.2	To Disconnect PA
1-2-3-3	To Sound Alarm
1-2-3-4	To Silence Alarm

DOCTOR

Jr. B.R. Harris	 329-1760
Poly Clinic	

Dr. Harris cannot be reached, ask for the followg doctors in the order listed below until one is intacted:

Jr. J.J. Lane	329-1760
Dr. A.M. Shafer	

uring off shift and weekend hours, the clinic answering service will make contact the physician.

EMERGENCY CALLS

Shepard Ambulance	322-0330
Fire En	nergency! Dial
King County Sheriff	of the
First Aid	
Rescue	lice Fire Medical
Providence Hospital Emergency Room	n 326-5691
Harborview Hospital	223-3000
Seattle City Light	625-3000
Washington Natural Gas Co	622-6767
Water Dept	625-4185

PLANT PERSONNEL

R.E. Rhoades(b) (6)
W.E. Bowers
F.H. Emme
B.S.K. Fung
G.D. Graves
R.H. Bleikamp
P.E. Martin
M.N. Miller
J.L. Nichols
B.E. Pallante
G.L. Podrabsky
T.B. Rahier
J.R. Danielson

APPENDIX

DOT LIST OF CLASS "A" POISONS (49 CFR 172.101)

Material	Physical State At Standard Temperature
Arsine	Gas
Bromoacetone	Liquid
Chloropicrin and methyl chloride mixtu	re Gas
Chloropicrin and nonflammable, non- liquified compressed gas mixture	Gas
Cyanogen chloride	Gas (>13.1 C)
Cyanogen gas	Gas
Gas identification set	Gas
Gelatine dynamite (H.E. Germaine)	
Grenade (with Poison "A" gas charge)	
Hexaethyl tetraphosphate/compressed gas mixture	Gas
Hydrocyanic acid (prussic) solution	Liquid
Hydrocyanic acid, liquified	Gas
Insecticide liquified gas containing Poison"A" or Poison "B" material	Gas
Methyldichloroarsine	Liquid
Nitric oxide	Gas
Nitrogen perioxide	Gas
Nitrogen tetroxide	Gas
Nitrogen dioxide, liquid	Gas
Parathion/compressed gas mixture	Gas
Phosgene (diphosgene)	Liquid

DOT HAZARDOUS MATERIAL CLASSIFICATION (49 CFR 173.2)

- 1. Radioactive material
- 2. Poison A
- 3. Flammable gas
- 4. Non-flammable gas
- 5. Flammable liquid
- 6. Oxidizer
- 7. Flammable solid
- 8. Corrosive material (liquid)
- 9. Poison B
- 10. Corrosive material (solid)
- 11. Irritation material
- 12. Combustible liquid (in containers having capacitie exceeding 110 gallons)
- 13. ORM-B
- 14. ORM-A
- 15. Combustible liquid (in containers having capacities of 110 gallons or less)
- 16. ORM-E

PLAN FEEDBACK FORM

PROBLEMS WITH PLAN REQUIREMENTS:
UNEXPECTED SITUATIONS ENCOUNTERED:
RECOMMENDATIONS FOR FUTURE REVISIONS:
PLEASE RETURN TO JOE DARCY, WRHSO.

EXPOSURE HISTORY FORM (To be completed by Project Manager)

JOB NAME:

Confidential

JOB NUMBER:

15088-001-05

EMPLOYEE NAME:					
SIGNATURE:	and the same way approximate to the same and the same and the same with these same and the same				
DATES FROM/TO:					
HOURS ONSITE:					
SUSPECTED CONTAMINANTS	VERIFIED CONTAMINANTS AND AIRBORNE CONCENTRATIONS THEREOF				

Machete herbicide, paper sizing agent, plasticizer, vanillin, vanillin balck liquor, vanillin black liquor solids, carbon disulfide, carbon tetrachloride, dibutylphthalate, isopropyl alcohol, organics (NOS), pentachlorophenol, polychlorinated biphenyl, toluene.

ACCIDENT REPORT FORM

Do not use for motor vehicle or aircraft	accidents
TO FROM TELEPH	ONE (Include area code)
NAME OF INJURED OR ILL EMPLOYEE	
DATE OF ACCIDENT TIME OF ACCIDENT	EXACT LOCATION OF ACCIDENT
NARRATIVE DESCRIPTION OF ACCIDENT . NATURE OF ILLNESS OF INJURY AND PART OF BO	ODY INVOLVED
LOST TIME: YESNO	
PROBABLE DISABILITY (Check one) FATALLOST WORK DAYS AWAY FROM WORK NO LOST WORK DAYSFIRST AID ONLY	RESTRICTED WORK DAYS
CORRECTIVE ACTION TAKEN	
CORRECTIVE ACTION WHICH REMAINS TO BE TAKE	
NAME OF SUPERVISOR	TITLE
SIGNATURE	DATE

DAILY INSTRUMENT CALIBRATION CHECK SHEET

	INSTRU	JPIERT			
	SF	ERIAL #		-	
DATE	PURE AIR Y/N	CALIBRATION GAS (PPM)	BATTERY CHECK GOOD/BAD	CALIBRATED BY	REMARKS
					
				ے جس جیوں دیوں کیے کیے دست سنری شدہ صف میٹن نہائے کہ انہا کہ انہ کی دروں میں ان انہاں کی انہاں کا انہاں کی سال انہاں کا انہاں کی سال انہاں کا انہاں کا انہاں کا انہ	
					المتالية التي يدين شائد فيهم سيما والما الشار منها فيها الكالة الكالة
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		والمراجعة			
	10 am can am am am an an an an an an				
					
					
		والمراجعة المراجعة ا		·	

DAMES & MOORE

PLAN ACCEPTANCE FORM

Instructions: This form is to be completed by each person scheduled to work on the subject project work site and returned to the Office Safety Coordinator who will forward to the WRHSO.

Confidential

Job Name:

Job Number:	15088-001-05
Location:	Seattle, Washington
Plan Date:	June 30,1986
plan and the Safety/Hygie	d and understand the contents of the above ene Guidelines of the Monsanto Seattle Plant. rk in accordance the regulations of above said
	Signed
	Print Name
	Company/Office

Date

6.0 SCHEDULE

Dames & Moore is capable of meeting the schedule required for this project. Assuming we receive authorization to proceed on Wednesday, July 2, we will begin field work on Sunday, July 6. Drilling and sampling will be completed on Sunday, July 20. Some laboratory analyses will be performed concurrent with field work; all laboratory results will be returned by Friday, August 1.

Dames & Moore will, with the above schedule, be prepared to release a draft report on Wednesday, August 13, 1986.

SCHEDULE OF CHARGES

Dames & Moore

UNITED STATES & CANADA

The compensation to Dames & Moore for our professional services is based upon and measured by the following elements, which are computed as set forth below.

PERSONNEL CHARGES

Charges for employees are computed by multiplying the total direct salary cost of our personnel (expressed as an hourly rate) by a factor of 2.5. The total direct salary cost shall be a sum equal to the direct payroll cost (computed by dividing the annual payroll cost by 1,940 hours) plus 30 percent of same to cover payroll taxes, insurance incident to employment, sick leave and other employee benefits. The time of a partner or retained consultant devoted to the project is charged at an assigned billing rate.

The 30 percent employee benefit factor is used for work performed by personnel assigned to offices in the United States and Canada. For work performed by personnel in our offices in other countries, it will vary depending on the employee benefits paid in the particular location.

When outside the United States, employees' and partners' total direct salary cost will be increased by the premium customarily paid by other organizations for work at that location.

Time spent in either local or inter-city travel, when travel is in the interest of the work, will be charged for in accordance with the foregoing schedule; when traveling by public carrier, a maximum charge of eight hours per day will be made.

EQUIPMENT CHARGES

Computer control of project costs will be billed at a rate of \$1.25 per each \$50 of job charges or fraction thereof. Other Dames & Moore equipment, if used, will be billed at the rates noted in the Appendix.

OTHER SERVICES AND SUPPLIES

Charges for services, equipment and facilities not furnished directly by Dames & Moore, and any unusual items of expense not customarily incurred in our normal operations, are computed as follows:

Cost plus 10 percent includes shipping charges, subsistence, transportation, printing and reproduction, long distance communication, miscellaneous supplies and rentals.

Cost plus 15 percent includes surveying services, land drilling equipment, construction equipment, testing laboratories, contract labor.

Cost plus 25 percent includes aircraft, watercraft, helicopter and marine drilling equipment and operation.

SCHEDULE OF CHARGES - APPENDIX

Dames & Moore

EQUIPMENT

AUTOMOTIVE	
Vehicle, per hour (maximum of 8 hours per day)	
SOIL	
Soil sampling and compaction control equipment, per shift hour	
Soil sample rings and containers, per sample	
LABORATORY	
Soil, water and biologic testing equipment – per employee, per hour	
Dynamic Testing Equipment will be quoted as required	
DIVING	
SCUBA diving, per diver, per day	
REPORT PREPARATION	
Word Processing Equipment, per hour	
In-House Reproduction, per sheet	

ENGINEERING COMPUTER SERVICES

The use of Dames & Moore's in-house computer facilities will be charged in accordance with the "Engineering Computer Applications Billing Schedule" (attached). Computer time and other services provided by outside vendors will be charged at cost plus 15%. Terminals, plotters, forms, and computer supplies will be charged at cost plus 15%.

FIELD

Because of the varied nature of equipment, location and use, these rates will be quoted as required.

115.4 (REV. 2.82)